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This Week in The RON AG

Vol. 152, No. 11

September 9, 1943

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"Share the Steel" Plan Succeeding!

Idle Steel Goes into War Production

American steel-users, cooperating in the WPB's "Share the Steel" program, already have released approximately a million tons by eliminating idle or duplicate stocks, and through cancellation of mill tonnages on order. Another million tons are in prospect. This will mean the equivalent of adding two million tons of steel production for war use in the third and fourth quarters which is the goal of the War Production Board.

Constantly improving warehouse stocks help to make this program safe and practical because one stock in a manufacturer's inventory serves only one manufacturer, while a similar stock in a centrally located steel warehouse serves thousands of manufacturers. The warehouse stock moves faster and less steel is required.

The need is urgent! Let's keep every ton of steel working. It will not only help the war effort, but it is good business to hold your inventory to a practical working level. Then if increased production, changes in design or some emergency requires more steel in a hurry, you can always depend on your nearby steel-service plant.

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Death Penalty for Inspectors

REPRESENTATIVE HOBBS, of Alabama, has discovered a new way to lose the war. He has introduced a bill in Congress enacting the death penalty for the willful delivery of defective material to the armed forces. A fine of up to \$1,000,000 is the alternative.

There may be a few concerns in this country where management might conspire with its inspectors to pass defective material for private gain. Thus far, out of the tens of thousands of contractors who are working on war materiel there are not more than five such cases pending in the Justice Department.

Under the present law, the maximum penalty for a war fraud conviction is a two year imprisonment and a fine of \$10,000. If the offense however, can be classified as deliberate sabotage, such as could be the case with the intentional passing off of defective material then there is a possible penalty of 30 years in prison.

Thus, under existing laws, we have ample power to severely punish willful offenders. If 30 years on the rock pile is not a deterrent, then the death penalty would not be either.

The trouble, in any case, would be to prove actual intent and also to clarify the term "defective." Congressman Hobbs' state for instance, is noted for its cotton. It is a well known fact in the cotton textile industry that any buyer can arbitrarily cancel his order for cotton cloth at any time before acceptance of delivery for the simple reason that defects of one kind or another are invariably present. Thus in a period of falling prices there will be a wave of such cancellations, whereas in a rising market the customer will be only too glad to accept the same material.

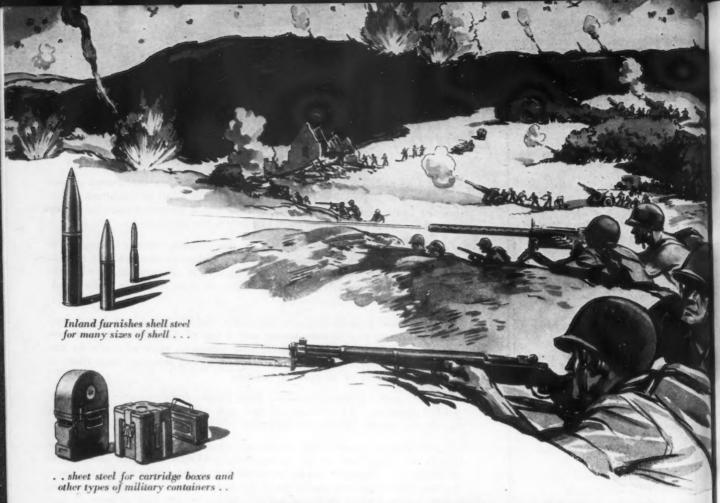
While defects in the metals industry can be more precisely defined than in textiles, there is still much to be done before many specifications are quibble-proof. The ASTM has been working for many years in the endeavor to set up standards which will determine if material is defective or not defective. Yet many of the specifications end up with the words: "as mutually agreed by the purchaser and vendor." Thus even experts cannot agree on what is defective and what is not.

Congressman Hobbs' bill carries the responsibility and the penalties through the management as well as the offending individual and as far as the stockholders. Thus apparently, Widow Jones, one of many thousands of small stockholders in one of our large corporations might face a possible million dollar fine or electrocution for the act of an inspector of the company.

Naturally, no court in this country would enforce such a ridiculous and unjust perversion of the law and Widow Jones need lose no sleep on this account. But the vicious effect of this bill would fall directly upon inspection. If passed, which it probably won't be, the flow of war material would be cut in half almost immediately. No inspector could perform efficiently with a sword suspended over his head and there would be a wholesale exodus of presently employed inspectors to less hazardous occupations such as for example, front line troop service.

Overzealousness in attempting to win this war through legislation of this sort might well result in our losing it.

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. . special steel for large and small caliber gun barrels . .



and high-strength Hi-Steel that withstands the terrific stresses in gun carriages.

Wherever Allied Guns Roar You'll Find Inland Steel

Deep in the jungles of the Solomon Islands, on the plains of Russia, in southern Europe, Allied fighters are pounding positions, using guns and shells made of Inland Steel.

Special steel for small and large caliber gun barrels is made by Inland for a Government arsenal. It is steel requiring the most careful selection of raw materials, perfect furnace conditions, and the closest possible metallurgical control.

Carriages for large field guns must be built of steel that is as light as possible, is easily fabricated and will retain its high strength under terrific and relentless pounding. Inland Hi-Steel, the low alloy, high strength, corrosion-resistant structural steel, meets all these requirements.

Each day Inland makes shipments of shell steel that are to be forged and turned into many sizes of shells up to 155 mm. The uniform high quality of this steel has helped manufacturers meet production schedules.

Ledloy, the lead-bearing, faster-machining Inland steel, is going into millions of shells and is resulting in higher production, lower unit cost and longer tool life.

Yes, wherever Allied guns roar you'll find Inland steel in the guns and shells, as well as in many other types of fighting equipment, with which our men are winning Victory.



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NEWS FRONT

- U. S. Commercial Co., a little known subsidiary of RFC, is slated to burgeon as the government's central foreign purchasing agency. It will swallow the foreign activities of Metals Reserve Co. and Defense Supplies Corp. and the old BEW Office of Imports.
- Manpower, rapidly becoming the critical material in every war production field, shapes up like this in aluminum: Mining and refining, no serious trouble yet; reduction, very serious; fabrication, serious all down the line.
- Specifically, 75,000,000 to 100,000,000 lb. of aluminum have been lost through the seven idle West Coast pot lines this year, with no prospect of operation for at least several more months.
- And operation of the Alcoa small hammer forgings plant in Cleveland, which has never reached 80 per cent of capacity, dropped to about 50 per cent all summer with manpower shortage the major cause. Small hammer forgings are the tightest spot in aluminum.
- At present turnover rates, WPB figures 150,000 additional aluminum productive workers will have to be hired this year to achieve the net of 65,000 needed.
- The magnesium picture is sufficiently bright that the procurement agencies are doping out uses for it as a substitute metal. One scheme getting favorable consideration is magnesium landing mats.
- Two large sources of manpower for war work are the construction and machine tool industries, activities of which are declining rapidly. Switch to war work is being resisted by construction workers, who are exerting considerable political pressure to expand housing projects, etc.
- Crew-less radio controlled bombers are moving from the Sunday supplement into respectable society. The English shot a German one down several weeks ago.
- The Kaiser-Hughes giant plywood flying boat, that should be test flying in the not too distant future, today is in the following condition—a mock-up of one center section, several pieces of 16-ply plywood fastened together. Rumor has it that E. G. Bern, plant manager, and J. F. Leduc, works manager, have resigned.
- And: Permanente, Kaiser's magnesium plant, originally planned for 50,000,000 lb. yearly output, today is built up to a probable maximum capacity of 24,000,000 lb. yearly, is now producing at a rate of 18,000,000 lb. yearly.
- Supplementary droppable fuel tanks to extend the range of fighters have long been made of steel or aluminum. The Japanese prefer fibre. Britain is switching to a wrapped-paper construction, and the U.S. is indicating preference for non-metallic types, which apparently withstand severe vibration better than some of the metal tanks used.
- German internal propaganda now is busy trying to prove that the Luftwaffe was the first to introduce special "train buster" squadrons, the so-called "Lok-Toter". The Ju 88s and He 111s used for this purpose on the Russian front are said to be very successful. For the British who attack trains, the Germans use the term "cowardly murder".
- Sault Ste. Marie's new 24-ft. MacArthur lock compares with 22.6-ft. draft previously available. Thus, 1000 tons more ore can be loaded onto the 21 new Maritime and Pittsburgh boats, representing 700,000 tons more per season.
- The latest issue of "Schwarze Korps", the newspaper of Hitler's Black Shirts, stated that the Russians, seen from a racial point of view, were almost equal to the Germans, and therefore natural allies of the Third Reich. Meanwhile: Lieutenant-General Dietmar, the most authoritative German military commentator, in recent broadcasts directed to England, is almost frantically pointing out the dangers to Britain in the event of a Russian victory.
- Dietmar frequently emphasizes that German people are particularly bitter about the U.S., which is protected by remoteness but still a leading instrument in "intensifying and brutalizing" the war. Dietmar often emphasizes that as the U.S. is progressively forced to give up the idea of a riskless war, crime, corruption and the black market in their most virulent form will crack and tear the edifice of this nation apart.

Comparative Effects of B

OST of the data which have been published to illustrate the remarkable effects of very small boron additions on the hardenability and mechanical properties of low-alloy steels have been presented in such a way as to compare the properties of a given boron-treated steel with those of a strictly similar steel without the boron treatment. This is no doubt the correct method of comparison from a scientific point of

By GEORGE F. COMSTOCK

Metallurgist, Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

view, to determine what boron does to the properties of such steels. To many steel users, however, such comparisons may appear to be largely of academic interest. What they are

primarily interested in, is the selection of the best and most economical type of steel to use for obtaining the strength and toughness necessary for satisfactory service of a given part of a machine structure.

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Other articles on intensifying and addition agents containing boron appeared in THE IRON AGE, issues of Nov. 19, 1942; Feb. 4, March 25, July 1 and Aug. 19, 1943.

For instance, suppose a forging of about 2 sq. in, cross-section is needed with tensile strength of 160,000 lb. per sq. in.; many different types of steel could be found which, after appropriate heat treatment, would meet that requirement. The wise user, however, would choose the steel that had the best ductility and shock resistance, after heat treatment for the necessary strength, in order to be sure of the best chance of surviving accidental abuse in service. Under normal conditions of competition the cost factor would also be very important.

To meet the strength and ductility requirements, in the size mentioned above, the steel would have to be quenched and tempered, and a fair degree of hardenability would be essential so that the part could be strengthened by an average quench right through to the center. This would call for an alloy steel, containing either manganese above the normal amount, or chromium, molybdenum, nickel, or boron. relations of these various alloys, each added to steel in amounts giving equal hardenability, are about as shown in Table I.

It is evident from Table I that although boron in the form of Bortam costs a little more than manganese for producing an equivalent increase in hardenability, in the form of Carbortam it is much cheaper. A comparison of these titanium-boron alloys with molybdenum on the basis of the tensile and impact properties of treated steel was given in a recent article in Metals and Alloys. (Vol. 17, No. 5, May, 1943, p. 978.) A similar comparison of these same alloys with manganese is given here.

Carbortam in 0.37C Steel

The properties of three heats of 0.37 per cent carbon steel are com-

TABLE I

Costs of Suitable Amounts of Various Alloys Required for Increasing the Hardenability of Steel to the Same Degree

Alloy	Lb. Per Net Ton	Price Per Pound	Content of Element Required in Steel, Above Usual Value	Cost Per Net Ton of Steel
Nickel Molybdenum (oxide) 70% Ferrochromium 80% Ferromanganese Bortam Carbortam (1% B)	24.0	\$0.26	1.20% Ni ^a	\$6.24
	4.0	0.80	0.20% Mo	3.20
	10.0	0.14	0.35% Cr ^a	1.40
	15.0	0.0625	0.60% Mn	0.95
	2.8	0.45	0.0025% B	1.16 ^b
	6.0	0.0825	0.0025% B	0.50

According to W. Crafts, Metal Progress, December, 1942, p. 1664.
 With allowance for the value of Mn and Si in the Bortam.

TABLE II

Properties of Quenched and Tempered 0.37 Per Cent Carbon Steels

Steel No. (See Fig. 1)	1 1.2 3.5	2 3 8.4	3 4.5 8.6
Carbon content, per cent Manganese content, per cent Phosphorus content, per cent Sulphur content, per cent Silicon content, per cent Titanium content, per cent Boron content, per cent	1.28 0.026 0.034 0.31 0.038	0.37 1.83 0.032 0.021 0.20 0.038	0.36 1.26 0.022 0.034 0.29 0.045 0.0015
Yield point, lb. per sq. in., tempered at 450 deg. F. Tensile strength, lb. per sq. in., tempered at 450 deg. F. Elongation in 2 in., percent, tempered at 450 deg. F. Reduction of area, per cent, tempered at 450 deg. F. Rockwell C hardness, tempered at 450 deg. F. Izod impact value, tempered at 450 deg. F., ft-lb. at 75 deg. F.		212,000 256,000 12.5 45.6 49.0 8.3	234,000 259,000 12.0 48.1 49.5 18.0
Yield point, lb. per sq. in., tempered at 900 deg. F. Tensile strength, lb. per sq. in., tempered at 900 deg. F. Elongation in 2 in., per cent, tempered at 900 deg. F. Reduction of area, per cent, tempered at 900 deg. F. Rockwell C hardness, tempered at 900 deg. F. Izod impact value, tempered at 900 deg. F., ft-lb. at 75 deg. F. Charpy impact value (Izod notch), tempered at 900 deg. F., ft-lb. at 75 deg. F. Charpy impact value (Izod notch), tempered at 900 deg. F., ft-lb. at —30 deg. F. Charpy impact value (Izod notch), tempered at 900 deg. F., ft-lb. at —50 deg. F.	20.0 59.0 30.0 51.3	137,500 146,000 19.0 55.0 31.0 40.0 35.4 15.4	138,000 142,000 18.0 54.2 31.0 51.7 54.0 47.2

Boron and Manganese

on Some Properties of Heat Treated Steel

pared in Table II, and their Jominy hardenability curves are shown in Fig. 1. One of these, No. 1, was a normal 1.28 per cent manganese steel made fine-grained by deoxidation with aluminum and titanium, and with a hardenability value of only a little over 1 at Rockwell C 50, as shown in Fig. 1. In steel 2, which was similarly deoxidized, this hardenability value was raised to 3 by increasing the manganese to 1.83 per cent; while in steel 3, with 1.26 per cent manganese, the Rockwell C 50 hardenability value was raised to about 4.5 by treatment with Carbortam and aluminum, giving a boron content of 0.0015 per cent. Tensile and impact test specimens were normalized after forging, rough machined about 1/2 in. round and square respectively, quenched in oil from 1550 deg. F., and tempered 2 hr. to give the properties noted in Table II.

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Steels 2 and 3 are shown in Table II to be about equally superior to Steel 1 in strength after quenching and tempering, owing to their better hardenability. The ductilities are also much alike, so that it made little difference in tensile properties whether the increase in hardenability was produced by raising the manganese 0.55 per cent, or by Carbortam treatment. But the notched-bar impact values are definitely higher for Steel 3 treated with Carbortam. Thus the use of Carbortam to provide strength in this heat treated steel was not only more economical than raising the manganese, but also gave a decided improvement in toughness in steel of equal strength.

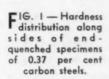
Bortam in 0.28C Steel

In steels of lower carbon and manganese contents the advantages of increasing the hardenability by boron alloy treatment are not quite so marked, though still definitely appreciable. In Fig. 2 it is shown how the Rockwell C 40 hardenability value of 0.27 to 0.29 per cent carbon steel is about doubled by either Bortam treatment, or by raising the manganese from 0.65 per cent to 1.12 per cent. All these steels were deoxodized with aluminum. Tensile and impact test specimens were prepared in the same

... These data deal with the properties of steels treated with Bortam or Carbortam. Particularly significant is the attention directed to the selection of the best and most economical type of steel to use for obtaining the strength and toughness necessary for satisfactory service of a given part of a machine structure.

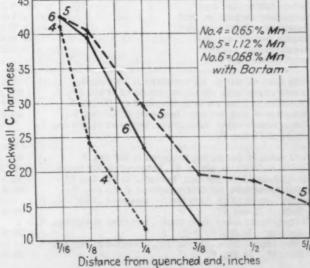
way as described above, except that the quenching temperature was 1600 deg. F. The results of these tests are reported in Table III.

Table III shows for Steel 4 the low yield point and hardness, and high ductility and impact values characteristic of a normalized steel, the hardenability of this analysis, as indicated in Fig. 2, being so very low that even the small test specimens were not hardened effectively by the heat treat-



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FIG. 2 — Hardness distribution along sides of end-quenched specimens of 0.28 per cent carbon steels.



ment employed. The Bortam treatment in Steel 6, although not providing quite as much hardenability or tensile strength in this 0.68 per cent manganese steel as raising the manganese to 1.12 per cent, gave better yield point, ductility, and impact values than in the higher manganese Steel 5.

Bortam in 0.28C | Mn Steel

In steels with over 1 per cent manganese the boron alloy treatments are more definitely beneficial, even with carbon contents no higher than 0.28 per cent. This is illustrated by Fig. 3 and Table IV, where the properties of quenched and tempered specimens of the same steels are reported. These data provide a comparison between a Bortam-treated Steel 9 containing 1.23 per cent manganese, and two highermanganese steels, without boron, of very nearly the same hardenability and strength. All these steels were deoxidized with aluminum, and the test specimens were prepared in the same way as previously described.

Table IV differs from Tables III and II in not furnishing a comparison

with a low manganese steel without boron; the data for Steel 5 in Table III can be referred to, however, if such a comparison is desired. The lower-manganese Bortam-treated Steel 9 in Table IV is evidently superior to the other steels with higher manganese both in strength and impact value, especially at the lower temperatures. Thus Steel 9 should be the most desirable of these steels for general engineering uses. The lower ductility of Steel 9 after tempering at 900 deg. F. could be largely corrected by using a slightly higher tempering temperature to bring the strength down to a value equal to that of Steel 8. It was found, for instance, that tempering Steel 9 at 915 deg. F. gave a tensile strength of 137,800 lb. per sq. in., with 129,200 yield point, 16.5 per cent elongation, and 60.7 per cent reduction of area (probably an abnormally low value on account of an internal split in the fracture). Such tempering would, of course, improve the impact value, and show a still greater advantage in that respect over the higher manganese steels.

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TABLE III Properties of Quenched and Tempered 0.28 Per Cent Carbon Steels of Low Hardenability

Steel No. (See Fig. 2) . Hardenability value at Rockwell C 40	1.1	2.1	1.8
Carbon content, per cent	0.27 0.65	0.29	0.29
Phosphorus content, per cent. Sulphur content, per cent. Silicon content, per cent. Boron content, per cent.	0.10	0.022 0.034 0.19	0.022 0.034 0.24 0.0052
Yield point, lb. per sq. in., tempered at 500 deg. F	98,750	90,650 141,100	98,800 118,900
Elongation in 2 in., per cent, tempered at 500 deg. F	23.5	9.5	11.0
Reduction of area, per cent, tempered at 500 deg. F	68.3	48.8	64.9
Charpy impact value (Izod notch), tempered at 500 deg. F		32.0	20.0
ft-lb. at 75 deg. F.	134.0	18.5	24.5
Charpy impact value (Izod notch), tempered at 900 deg. F.,	.0110	.0.0	
ft-lb. at 75 deg. F	100.5	79.0	77.5
Charpy impact value (Izod notch), tempered at 900 deg. F.,			
ft-lb. at -30 deg. F	59.2	64.5	82.0
Charpy impact value (Izod notch), tempered at 900 deg. F., ft-ib. at -50 deg. F.,	65.5	57.7	61.4

TABLE IV
Properties of Quenched and Tempered 0.28 Per Cent Carbon Steels
With Over I Per Cent Manganese

Steel No. (See Fig. 3)	4.0	5.0	6.2
Carbon content, per cent Manganese content, per cent Phosphorus content, per cent Sulphur content, per cent Silicon content, per cent Boron content, per cent	0.27 1.83 0.026 0.034 0.21	0.28 2.00 0.027 0.034 0.20	0.28 1.23 0.022 0.034 0.22 0.0038
Yield point, lb. per sq. in., tempered at 500 deg. F Tensile strength, lb. per sq. in., tempered at 500 deg. F Elongation in 2 in., per cent, tempered at 500 deg. F Reduction of area, per cent, tempered at 500 deg. F Charpy impact value (Izod notch), tempered at 500 deg. F., ft-lb. at 75 deg. F.	193,400 216,000 9.0 44.0 7.5	184,700 219,000 11.0 51.9	210,000 223,800 11.0 48.2 32.0
Yield point, lb. per sq. in., tempered at 900 deg. F Tensile strength, lb. per sq. in., tempered at 900 deg. F Elongation in 2 in., per cent, tempered at 900 deg. F Reduction of area, per cent, tempered at 900 deg. F Charpy impact value (Izod notch), tempered at 900 deg. F., ft-lb. at 75 deg. F Charpy impact value (Izod notch), tempered at 900 deg. F., ft-lb. at —30 deg. F Charpy impact value (Izod notch), tempered at 900 deg. F.,	112,700 127,300 15.5 60.5 76.5 39.5	128,800 138,300 17.5 64.8 61.5 25.0	138,000 145,500 15.0 58.2 66.0 64.5
ft-lb. at -50 deg. F	30.5	21.0	59.0

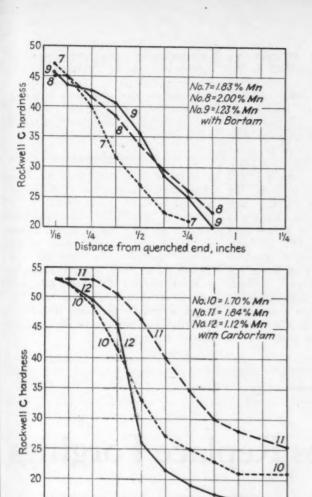
Carbortam in 0.40C Steel

In ordinary commercial practice, where appreciable variations in the chemical compositions of different heats of the same grade of steel are unavoidable, it will probably be necessary often to make slight adjustments in tempering temperature when making use of the boron alloy treatments in place of other more expensive alloys for securing a required amount of hardenability and strength. How this might work out is illustrated by the tests reported for Steels 10, 11, and 12 in Fig. 4 and Table V.

These heats were all deoxidized with aluminum and titanium, but only one of them, Steel 12, was treated with Carbortam, the others having been treated with a titanium alloy without boron. All the test specimens were normalized in the form of %-in. rounds. The tensile specimens were machined to about 1/2 in. diameter at the gage length before quenching in oil and tempering, and were then ground to size before testing. The impact specimens were not over 1/2 in. square when quenched and tempered. Tests of specimens tempered at 450 deg. F. were made only on Steels 11 and 12, not enough stock of the proper size being available from Steel 10.

The manganese deficiency in Steel 12, as compared with Steel 11, was evidently too great to be compensated by the boron addition, the hardenability of Steel 11 being distinctly higher. Steel 12 compares more closely in hardenability with Steel 10, in which there is only 0.58 per cent manga-

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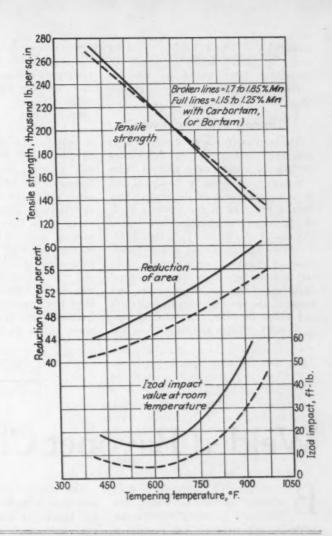
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UPPER LEFT

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Distance from quenched end, inches

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FIG. 3 — Hardness distribution along sides of end-quenched specimens of 0.28 per cent carbon steels.

0 0 0

LOWER LEFT

FIG. 4 — Hardness distribution along sides of end-quenched specimens of 0.40 per cent carbon steels.

0 0 0

UPPER RIGHT

FIG. 5—Variation of some properties of quenched manganese and Carbortam-treated 0.37 to 0.40 per cent carbon steels respectively, with different tempering temperatures.

0 0 0

nese. The tensile and impact comparisons of Steel 12 with both Steels 10 and 11, however, as reported in Table V, show consistently better reduction of area and notched-bar impact resistance for the boron-treated steel when tempered, not necessarily at the same temperature, but to the same strength as the higher-manganese steels without boron. Thus, the same advantage for the Carbortam

TABLE V
Properites of Quenched and Tempered 0.40 Per Cent Carbon Steels

Steel No. (See Fig. 4) . Hardenability value at Rockwell C 50	10 3.0 9.0	11 6.2 14.0	12 3.5 7.6
Carbon content, per cent Manganese content, per cent Phosphorus content, per cent Sulphur content, per cent Silicon content, per cent Titanium content, per cent Boron content, per cent	0.40 1.70 0.046 0.023 0.16 0.033	0.41 1.84 0.035 0.025 0.27 0.033	0.40 1.12 0.023 0.035 0.26 0.024 0.0042
Yield point, lb. per sq. in., tempered at 450 deg. F Tensile strength, lb. per sq. in., tempered at 450 deg. F Elongation in 2 in., per cent, tempered at 450 deg. F Reduction of area, per cent, tempered at 450 deg. F Rockwell C hardness, tempered at 450 deg. F Izod impact value, tempered at 450 deg. F., ft-lb. at 75 deg. F.		262,000 9.5 38.1	200,000 269,000 12.5 42.5 46.0 17.3
Tempering temperature, deg. F. for following tests. Yield point, lb. per sq. in. Tensile strength, lb. per sq. in. Elongation in 2 in., per cent. Reduction in area, per cent. Rockwell C hardness. Izod impact value, ft-lb. at 75 deg. F.	900 143,900 152,600 17.0 52.5 31.8 21.8	900 146,500 155,000 17.3 57.6 32.5 36.3	870 144,500 155,000 15.5 56.8 31.2 49.3
Tempering temperature, deg. F. for following tests. Yield point, lb. per sq. in. Tensile strength, lb. per sq. in Elongation in 2 in., per cent. Reduction of area, per cent. Rockwell C hardness. Izod impact value, ft-lb. at 75 deg. F. Charpy impact value (Izod notch), ft-lb. at —30 deg. F. Charpy impact value (Izod notch), ft-lb. at —50 deg. F.	52.9 30.2 25.0 9.9	950 133,000 145,000 19.0 55.0 28.5 44.3 14.7 14.5	900 136,000 146,700 17.0 59.4 29.8 51.7 45.3 49.0

treatment is found in this kind of steel, by slight adjustment of the tempering temperature, as was reported in the steels of lower carbon content.

Summary and Conclusions

The results of this work may be conveniently summarized by the curves of Fig. 5, which were plotted from averages of the data in Tables II and V. using also some of the impact test results reported in the writer's A. I. M. E. paper on complex deoxidizers. (Trans. A. I. M. E., Vol. 150, 1942, p. 408.) The form and relative positions of these curves are quite similar to those given to show the comparative effects of molybdenum and boron on the same properties in Metals and Alloys for May, 1943 (Vol. 17, No. 5, p. 978). They are, therefore, believed to represent with fair reliability the true effects of variations in the tempering temperature in spite of the fact that the present work has provided data only near the ends of the curves shown.

It is evident from these results that if pearlitic manganese steel of about 140,000 to 260,000 lb. per sq. in. tensile strength in the quenched and tempered condition is required, the steel will have better ductility and resistance to impact if the strength is obtained by treatment of a steel containing about 1.15 to 1.25 per cent manganese with Bortam or Carbortam, than if a steel with about 1.8 per cent manganese is used, without any boron addition. Both kinds of steel have practically the same hardenability, and the boron alloy treatment, if Carbortam is used, is even more economical than the extra manganese required for hardenability and strength without it. The rapidly increasing popularity of these titaniumboron alloys is thus logically accounted for by the advantages illustrated by the test results here reported.

Acknowledgments

Most of these tests were made by the author's associates, J. R. Lewis and A. S. Yocco, whose capable assistance is gratefully acknowledged. Thanks are also due to K. W. Traub for the boron analyses (made by the method described by Rudolph and Flickinger in Steel, April 5, 1943), to J. Milek for most of the other analyses, and to the Titanium Alloy Mfg. Co. for providing the necessary laboratory facilities and permitting the publication of the results.

Welded Bayonet Clips Replace Forgings

Y eliminating extensive machining operations which are necessary in many fabricating methods, arc welding has become a valuable time saver in the production of hundreds of products essential to the war effort. A notable example of the economies thus effected is indicated in the welding of bayonet clips at Pratt Industries, Inc., Frankfort,

The original clip, shown at left in Fig. 1, was machined from a forging -a slow and expensive operation. The Ordnance Department suggested that the clips be produced from seamless tubing, forming the part in dies, but this was given up as too difficult a procedure. After calling in representatives of the Lincoln Electric Co. for a recommendation, it was decided that the clips could best be made by changing to a welded design, placing the welds at the top of the band. This choice was dictated primarily by requirements of forming the part.

The present method of manufacture is to make these stud bands from flat blanks of SAE 1020, measuring 1½ x 4.350 in. x 0.072 in. gage. This blank then goes through three punch press operations and then comes to

the welding fixture in the form shown

+005 -FIG. 2—End view of WELD bayonet clip showing welded seam and close tolerance paints at face and neck of part. BELOW FIG. I—Original clip
(left) made of forged
steel requiring expensive machining operations. Arc welded clip,
(center). Completed (center). Completed clip (right) after weld-ing and machining.



in Fig. 2. Twelve or more of these individual bayonet stud bands are placed on a mandrel in the welding fixture and the air operated jaws bring these up against a copper fin which holds the dimension across the neck and at the same time permits 100 per cent weld penetration. This group of parts is then welded without breaking the electric arc and emerges as a long piece of tubing which is then broken apart into the individual bayonet stud bands (see Fig. 1, center).

Despite the close tolerance of plus or minus 0.005 in. across the face and plus or minus 0.0025 in. across the neck (see Fig. 2), very few rejects are encountered and it has been possible to greatly reduce the machining time.

This procedure has proved very rapid and very satisfactory, as two men with one welding machine can produce several hundred stud bands per hour. The helper loads and unloads the mandrels and breaks the bands apart into individual units as they come from the welding operation.

By redesigning the jig to accommodate 15 or 16 pieces at one time, the company is expected to materially increase output per welder in the near

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Aluminum Parts Gaged at Constant Temperature

ANY aluminum parts accepted by steel gages and standards will be rejects if there is a 10 deg. F. change in room temperature. This difficulty is due to the large difference in thermal expansion of the aluminum parts and the steel gages and standards. A part clamped in a machine fixture quickly assumes the fixture temperature. which is often 10 to 15 deg. above the room temperature. The room temperature itself may change from 70 to 95 deg, in a few summer days in the Midwest. These changes will make any close control of large dimensions impossible under ordinary machine

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minum paint and insulated from its support with a gasket to reduce loss of heat. As shown in the drawing, the water in the tank is under no pressure, so that the weight of the plate on a gasket will seal enough to prevent leakage. The outlet water can be drained into another tank for soaking parts to be gaged. Inlet water should be sprayed into the tank to prevent formation of hot and cold layers. The thermostatic control should be accurate to 1 or 2 deg. If water that is too hot or cold is used, it may be necessary to by-pass small amounts to temper it.

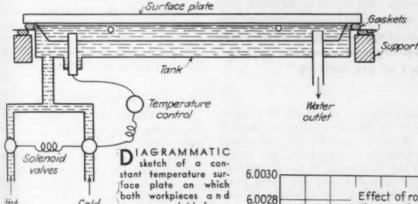
To prevent dew condensation on

the plate and fixtures on muggy summer days, the temperature should be set above the extreme dew point, usually at 75 to 80 deg. F.

Parts gaged must naturally be close to the gaging temperature. Aluminum parts fresh from machining may be 1/2 hr. or more in reaching room temperature. If placed in good contact with the plate or fixtures on the plate, or immersed in a bath, they will assume the correct temperature in a few minutes. To prevent rusting, the parts can be immersed in kerosene or other solvent, or in a soluble oil-water emulsion contained in a tank surrounded by the overflow water.

Bottoms of gages, fixtures and standards must be flat and have a large area in good contact with the plate. Gages on pegs may be set in a steel pan containing mercury, but the bottom of the pan must be very flat to insure good heat conduction from the plate.

Dial gages need not be on the plate if they are checked frequently with standards that are kept in good contact with the plate until ready.



gaging.

shop conditions unless there is assurance that gages and work are at the same temperature.

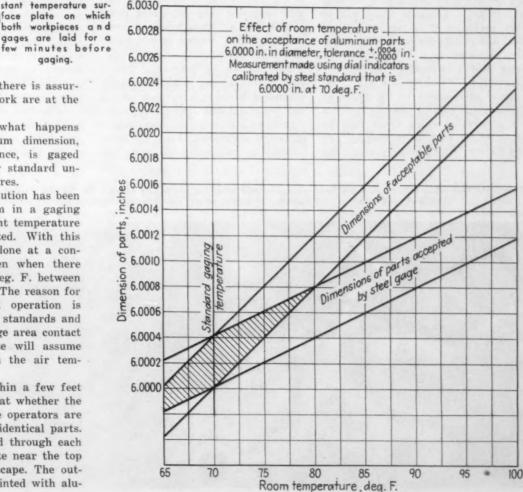
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The graph shows what happens when a 6-in, aluminum dimension, with 0.0004-in. tolerance, is gaged with a steel fixture or standard under varying temperatures.

A quick and easy solution has been found for this problem in a gaging system using a constant temperature surface plate, illustrated. With this plate, gaging can be done at a constant temperature even when there is a difference of 25 deg. F. between the plate and the air. The reason for the plate's successful operation is that shiny parts, gage standards and gage fixtures with large area contact with the surface plate will assume the plate rather than the air tem-

The plate is set within a few feet of the machines, so that whether the day is hot or cold, the operators are assisted in producing identical parts. A 4-in. hole is drilled through each rib of the surface plate near the top to allow the air to escape. The outside of the tank is painted with alu-



Control of Arc Welding Mass Production

By WALTER J. BROOKING Director of Testing and Research, R. G. LeTourneau, Inc., Peoria, Ill.

... In the second and concluding part of the article begun last week, the author shows the role setup and welding fixtures play in engineering control of repetitive welding operations, before discussing the important factor of fitup. Improvement in quality and reduction of costs are cited as advantages of complete engineering control of all factors of arc welding.

THEN the management of a welding organization commits itself to the policy of detailed and complete control of the engineering factors in arc welding, it not only undertakes a program which will be very profitable if carried to a practical and reasonable conclusion, but it also obligates itself to certain provisions and undertakings in its organization. Probably the most important prerequisite to the phase of engineering control which specifies the position in which welds shall be deposited, is that of furnishing jigs and fixtures which make possible the

positioning of the welds of a structure for the most economical welding.

While jigs and fixtures are usually considered in the light of the control of the positioning of structures, they also control a very important phase of the welding manufacturer's processing, that of setting up the structures for welding.

This setting up process is also a very important one to have carefully controlled because it in turn affects two important and economically very significant factors in the manufacture of welded equipment. First, the labor involved in positioning the parts and tacking them together for welding. Second, the positioning of the parts positively in the proper relationship so as to prevent excessive gaps and poor fitups. Both are extremely important in welding economics and will be discussed in a later paragraph.

Setup Fixtures

Arc welding jigs and fixtures may be generally classified as setup fixtures, welding fixtures, or combinations of the two. An example of a fixture used for the setting up of parts in their proper relationship and tacking them together without providing for positioning the part for welding is shown in Fig. 15. Such a fixture is made primarily for the positive, accurate placing of parts in their proper relationship with the least motion necessary, and if possible, without any measuring on the part of the man who sets up the part as he places them in the fixture.

FIG. 15—These setup fixtures eliminate hand measuring and laborious positioning of parts for this arc welded structure and its two substructures, and result in real economy of human effort, standardized structures and simplified operations.



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After they are located in the fixture, they are clamped in the simplest and most positive fashion possible and the parts are tack welded together.

Such a fixture should be simple in design, should have positive stops against which designated surfaces of the component parts of a structure come to rest and therefore automatically locate them in the proper relationship to the other parts; should have simple clamping devices which do not obstruct the putting of the parts into the fixture's frame, and should be made so that it is possible to tack weld the separate parts of the structure together in each of the critical points so that no place which should be tacked will not be tacked.

Some welding is frequently done in such setup jigs, especially in cases where box sections or box structures are built wherein inside gussets are placed and must be welded prior to putting on the top plate which encloses the inside gussets within the box section.

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Time studies of the amount of welding and the length of time it takes to do them in different positions (for example, the fillet or vertical position compared to the downhand position) indicates whether it is worthwhile to make such a setup jig, or a combination setup jig and positioning fixture in order to make the setup and the inside welds most economically.

Another phase of considerable importance of a good setup fixture is that the setting up process requires a certain amount of handling of parts and requires a certain amount of time, which if cut to a minimum can more efficiently be done by the arc welder who is going to weld the structure than by a separate workman who does the setup and who then turns the parts over to a welder for arc welding.

It is often a considerable advantage from the standpoint of most effectively keeping a crew of men working if the arc welder can set up his own structures and weld them himself. Under this arrangement, the welding machine which the operator uses may not be in operation quite as much of the time as if a separate setup man did the job, but a setup man requires a welding machine in order to tackweld the parts together. If the setup fixture is properly made so that there is no tedious measuring required, it takes the arc welder no longer to put the parts together and to tack them than it would for someone else to do it, and if he is going to weld the structure himself, there



FIG. 16—This simple positioning fixture allows the welds on this structure (setup in Figure 1) to be welded in the downhand position. Specifications may now call for downhand welding because the means of positioning can be provided.

is no waiting time while the setup is being completed so that he can immediately start to weld it.

Still another item of some importance is that very often the setup operation will be more carefully done if the man who is going to weld it does the setup job. A slight variation in the way in which parts are tacked together, especially if there is a slight deviation from the normal in the cutting of some of the parts, makes it possible for the setup man to control whether a structure will have proper fitup or whether the parts will leave gaps which will be very expensive to fill.

If the welding operator does his own setup work, he likely will be more mindful of the importance of making the fitup good than if a setup man were making the setups for someone else to weld.

Fig. 16 shows a welding structure positioner designed to rotate so that almost all of the welds in the structure may be welded in the downhand position. This is a simple positioner for the structure shown in Fig. 15. Such a fixture justifies its existence on parts which have enough welds running in any one plane to make the handling in the positioning fixture less expensive than the time required to make the welds in the position which they would naturally be without the benefit of a mechanical positioner.

The advantage of positioning a weld can best be determined by actually welding in different positions and using a stop watch to make some

TABLE I

Percentage of Welding Time Saved By Positioning Vertical and Horizontal Fillet Welds for Downhand Welding (Minutes Per Inch of Weld Based on Time Studies of Arc Time Plus Fatigue Allowance)

Size of Weld,	Min./In. of Vertical Weld	Min./In. of Horizontal Fillet Weld	Min./In. of Downhand (Positioned) Weld	Per cent Saved by Positioning Vertical Weld for Downhand Welding	Per cent Saved by Positioning Horizontal Fillet Welds for Downhand Welding
3/6	0.254	0.140	0.105	58.7	25.0
1/4	0.292	0.155	0.115	60.6	25.8
5/6	0.327	0.170	0.125	61.8	26.5
3/8	0.412	0.231	0.140	66.1	39.4
1/2	0.660	0.342	0.191	71.1	44.2



RIGHT

FIG. 17—Both the setup and weld positioning functions are served by this fixture for the standardized and controlled production of these heavy earthmoving unit parts on a mass production basis.

BELOW FIG. 18-A consistently good fitup of parts on structures such as this part of an earthmoving unit's side sheet must be achieved if size and type of elec-trode and setting of the machine are to be specified. Good fitup is half the battle for both control and economy of welded construction.

time studies, but ordinarily it can be considered that if the weld in a structure can be positioned, from 20 to 50 per cent of the welding time may be saved.

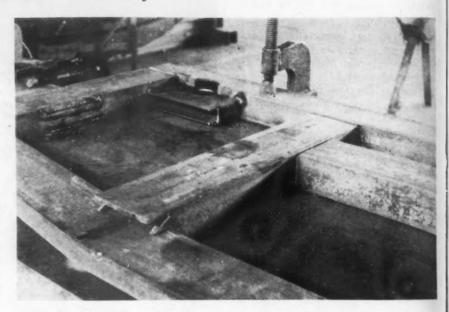
It is often not economical to position every weld in a structure, and it often is very satisfactory to do the setting up of such structures or parts into a completed structure in the same fixture in which it is welded.

Fig. 17 shows such a fixture wherein the parts are positioned and tacked together and are welded in the same fixture. This fixture rotates in one plane, and in the design of the fixture, the parts are set up into it in such a way as to make the longest weld or the greatest total amount of welding parallel to the plane of rotation so that those welds may be deposited in the downhand position. In such a fixture, both the objectives of control of setup and control of welding position may be achieved, and the time required for removing the structure from one setup jig into a positioning fixture is saved.

With fixtures which are properly designed and which can be turned to the same position every time with the same structure in it, the position in which 'the weld shall be deposited may very definitely be brought under control. Without such fixtures, it is difficult to establish a control of the position in which welds will be deposited, especially on complex structures.

Control of Fitup of Parts

Another factor in manufacturing of arc welded equipment which has a tremendous effect upon the degree of completeness and success of a method of control is that of fitup. Before the size of electrode, type of electrode, machine setting for each pass, and the number of passes required for a



weld may be specified to fill the requirements of any given welded job, the degree of fitup must be controlled.

See also "How to Avoid Poor Fitup in Arc Welding," by W. J. Brooking, THE IRON AGE, Nov. 6, 1941, p. 55.

It would be ridiculous to specify that the welds shown in Fig. 18, for example, should be made in one pass using a fluid, downhand type of electrode (for example, an American Welding Society designation E6020 type of electrode) of a relatively large size with a high heat in the downhand position if the parts did not fit together properly as shown, because obviously such a procedure would be impossible with any large gaps in these joints.

Granting that the fixtures used for setting up structures are designed to use normally correct fitting parts and granting that the setup operation is properly done, then the problem of fitup resolves itself into either use of templates in the manufacture of the parts themselves or good workmanship. Speaking in terms of welding on a mass production basis (where the frequency of part of the same kind is great enough so that templates may be studied and workmanship perfected) a very careful study of the cutting fixtures, templates and procedures is probably the greatest requisite to good fitting parts.

In the original design of a unit before it is in the production stage, templates are made for the parts which are drawn up first by the engineering department. The parts are cut from the templates, and the templates should carefully be kept and compared with the parts as they are used in the structure at the time it is built. Almost always there are corrections to be made in the parts and those corrections should be made in the templates also.

After the experimental unit has been made and tried and found to be satisfactory, then a "pilot order" of a small number, from two to five structures, may be made at which time ji the sti volved fixture advisal in the carefu plates proper tion of

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time jigs and fixtures are made for the structures and substructures involved in the unit. At the time these fixtures are made, it is often found advisable to make very slight changes in the form of certain parts and again carefully check to correct the templates for those parts so as to insure proper fitups on subsequent production orders.

Cutting templates again should be very carefully examined during the process of building the structures for the pilot order of units since small variations in fitups can be ironed out and the overall quality of the fitup of the units be much improved.

After the jigs and fixtures have been made for the structure and the templates corrected to the parts as

used in the pilot order, the templates should be in quite a dependable condition, and it should be possible to order a production order with the full expectation that the parts will fit. On the first of such production orders, a careful checkup should be made of the degree of fitup on all parts and correction of templates be made in case there are irregularities of fitups in the unit.

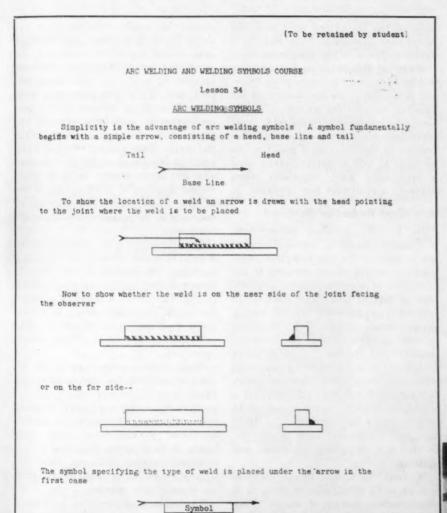
It should be borne in mind during this last checkup that if all of the parts of an order are found to fit poorly in the same way, then very likely it is a mistake in a template or an error in the basic procedure of cutting the part. If, however, part of the order fits properly and part of it does not, then the problem is an educational problem in perfecting the workmanship of the operator who cuts the parts or in the manipulation of the template during the cutting process.

Maintenance of Equipment

Granted that the proper jigs and fixtures are available to workmen who will be operating under a strict control of welding from the engineering standpoint and granted that the templates and equipment of the workmen who make the parts are in good condition, it is absolutely essential that some method of correct maintenance of these parts and equipment should be provided. If the jig and fixture department takes care of the maintenance of the fixtures, it falls to the foreman of the welding department to call for service on any fixture which gets out of adjustment in order to protect the interests of his workmen and also to maintain production schedules for an effective control.

The arc welders themselves should be taught the elementary phases of their operations as affected by the welding symbol control on the prints in order that they may know what the symbols mean and follow them. Such an educational course is made most effective by being taught by supervisors of welding (the welding engineer or some well-informed welding instructor or welding foreman) to apply specifically to the particular system of symbol control that is used in that plant and should be given to welding operators about the time they end their manual arc welding training and start their production welding work.

A series of lesson sheets, such as the one shown in Fig. 19, can be built up rather simply and can give the welding symbol lessons a step at a time in such a way as to make them



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FIG. 19—A step-by-step description and diagramming of the symbol system in a series of lesson and quiz sheets is a very effective means of teaching the symbol system of control to the welders in an organization.

BELOW

FIG. 20—The structures which make up these large earthmoving unit bodies were built on the same fixtures by the same workmen.



clear and not too concentrated for the student welder.

Improvements in Products Obtained

One of the greatest benefits of a rather complete engineering control of the welding process is that it results in standardizing of parts, structures and units, and in the interchangeability of parts which is essential to all mass production work.

The large welded machines shown being progressively assembled in Fig. 20 on a production and assembly line plan would be very much more expensive and would be less effective units in actual operation if they had to be "hand-tailored" part by part and structure by structure. The fact that every substructure and structure which goes to make up these units is made in a fixture by a skilled and trained workman who follows a very rigid control of welding, including all of the engineering factors of control. makes the part interchangeable one with the other on any machine of that particular type, and requires a minimum of special attention during the assembly work.

This control allows parts to be exchanged from one machine to the other, makes possible repairs in the field if necessary by sending a new structure to take the place of an old one, and makes possible the standardization of all of the operations required to manufacture and assemble this unit.

The quality of the workmanship done on any welded structure on a mass production basis is of necessity better when the operation has been standardized and placed under strict engineering control. This is especially true of the quality of welds because if a given weld is deposited on a structure with the same number of passes on a standardized fitup in the same position, using the same type of electrode, and the same machine setting, same size of electrode, by the same operator time after time in the same way, the welder becomes much more skilled in his operations and can produce a consistently better weld than if he were putting it in with different types of electrodes, in different positions, and on a varying procedure from one unit to the next.

Fig. 21 shows the difference in the appearance of welds deposited in different positions. The multi-pass horizontal fillet welds took more time, more skill and more cleaning time, but made no better welds than those deposited in the downhand position. Aside from the fact that welded joints usually cost less to weld in the downhand position, the improved appear-



F IG. 21—The multi-pass horizontal fillet welds shown here required more time for deposition, more manual skill and more cleaning time than the better looking, neater contoured, completely positioned weld being pointed at.

ance of the positioned weld over the multi-pass horizontal fillet weld is a factor in favor of the positioned weld.

Many of the welds made today on welded structures do not require dressing down, nor is the appearance of the finished weld so far as one or many beads is concerned considered especially important, although a weld deposited in the downhand position can be made to look better ordinarily than a multi-pass weld, especially when made by a relatively new operator.

Cost Reduction Achieved

By far the greatest achievement and most important accomplishment made possible by the complete engineering control of arc welding is the reduction of cost due to the elimination of wasted labor and material in the welding process. Chief among these sources of waste are the loss of weld metal and labor due to overwelding and the loss of weld metal and labor due to welding up gaps where a poor fitup has occurred. Beyond the reasonable assurance of a sufficiently large amount of weld metal to fuse the members of a joint together, additional weld metal deposited is a costly waste of time and material.

Without the benefit of specific control of weld sizes, over-welding is a very common source of waste. This is brought about by the natural human desire to want to do a job on the safe side so that the weld will not fail, and therefore leads to the deposition of larger welds than is required for that particular joint. This is not entirely confined to the workmen, for it is often observed that inspectors will inspect very rigidly for under-welding but will never even comment on overwelding.

A weld which is made one-half larger than the dimension which it

should be made requires over two times the welding metal and therefore over double the time required to deposit that weld. Also the additional amount of heat and weld metal concentrated in that one place may make an inferior joint because of the concentration of additional stresses and the greater amount of grain growth at the weld. This control of weld sizes, maintaining them up to the required size but down to the properly engineered amount of weld metal, is one of the most significant sources of economy in the manufacture of welded equipment.

The importance of bringing about a control which directly or indirectly decreases the amount of poor fitups is demonstrated by the diagram shown in Fig. 22. When a welding operator has to fill up a gap which is beyond the normal gap to be expected in that particular joint, it is a very costly operation.

Many factors contribute to the extra cost and reduced quality of a poor fitting joint. Among others, to deposit weld metal in a gap requires less amperage, frequently a smaller electrode, greater skill, and more beads of weld metal deposited in the locality, greater cleaning time and a larger amount of weld metal than the joint should require.

The extra time required to close a gap (to say nothing about welding it full afterwards) is frequently two or more times the length of time required to make the desired weld on that type of a joint if the gap is equivalent to half or more the thickness of the thinnest plate. Since labor is the most important item of cost in the deposition of weld metal, the cost of filling too wide a gap is a very expensive operation.

A third and really significant source of economy from a complete welding

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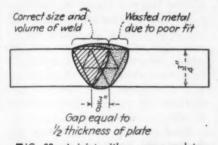
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control system is that of depositing the various welds on structures in the most favorable position, which is, from the economic point of view, almost always the downhand position.

If the fitup of the joints is maintained correctly and if the size of the welds are maintained properly, then the deposition of the welds in a downhand position or as nearly the downhand position as possible makes available to the manufacturer the other elements of the maximum efficiency of weld metals depositioned. The chart shown in the accompanying table illustrates the economy of positioning welds of various sizes for greater efficiency in deposition. Note that there is a significant reduction in cost in each successive step of positioning welds from the vertical to



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FIG. 22—A joint with a gap equal to one-half the thickness of the thinnest plate requires more than twice the volume of weld metal to complete it, plus the very costly time required to close the gap at the beginning of the weld. Such gaps in fit-up are extremely expensive when they occur, but may be prevented or corrected by correct control.

the completely downhand welding position.

Whenever a welded joint may be positioned in the strictly downhand position, it is possible to use a larger electrode which usually costs less per pound than the smaller electrode and which will burn off in almost the same length of time. Therefore it deposits considerably more weld metal per unit of labor in making such a joint

When a welding operator is working on the same structure regularly and is accustomed to the use of larger welding electrodes and practicing the handling of greater amperages (and therefore faster deposition), considerable progress can be made over what is "common practice" at the beginning of such a general trend in a manufacturing organization.

Within reasonable limits, there need be no sacrifice in quality of welding when a larger electrode is substituted for a smaller one in the same joint in the interests of greater speed of deposition. This is borne out by the test bars shown in Fig. 23 where the welds were deposited with 3/16,

¼ and 5/16 in. electrodes with the appropriate amperage and appropriate speed of travel for each electrode and setting. It is significant to note that the best weld obtainable on this particular joint as shown by penetration and tensile strength of the joint was made by the electrode which deposits the weld metal the fastest and which was the least expensive.

Upon examination, many of the elements which make for real economy in arc welding such as size of electrode, type of electrode, position of the weld, number of passes, size of weld and degree of fitup appear very often to vary by relatively small margins. Yet when added together, extremely significant economy in the whole welding process may be accomplished, particularly when the waste portion or slow operations are eliminated by proper engineering control.

Control is Practical

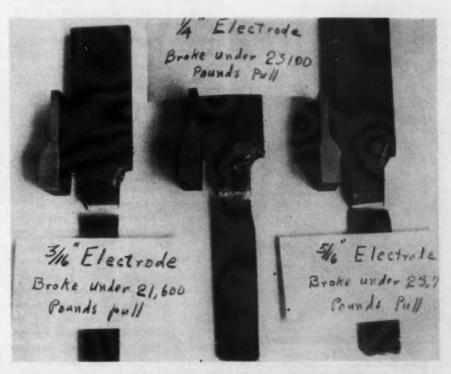
The most hopeful and the most interesting thing about the establishing of a complete engineering control of the factors of arc welding is that it is a process or development within an organization that does not have to be done overnight. It does not require a complete conversion in the thinking of all members of an organization; nor does it require a revolutionary change in fixtures, processing, procedures and common shop practice.

Instead it can be accomplished by a step-wise development along several lines which finally result in the establishment of complete engineering control.

Probably the first and most important step is that of building settingup and weld positioning fixtures. The second, and one of the most significant steps is that of improvement of fitups by the education of everyone along the line who is preparing parts and by study of fixtures and templates. The best part about both of these steps is that they automatically result in considerable economy in the manufacture of the products without the final stages of complete control, and are therefore worth doing within themselves.

The third step is that of controlling the size of the welds and the position in which they are deposited. Both of these may be controlled by use of simple welding symbols on prints. Such systems are already established and are being employed by many large organizations using the American Welding Society symbol code as the basis for the systems.

The introduction of welding symbols on the prints calls for an educational program and for specialized study on the part of some member of the organization connected with the engineering department. The studies which such an individual makes and the recording of such in-



F 1G. 23—The use of large electrodes and greater welding currents (within reasonable limits) does not involve a sacrifice in welding quality, but rather often improves the welded joint. In these three welds, made with three different sizes of electrodes at the appropriate current for each, the one made with the largest electrode was strongest, and looked the best when etched with acid in cross section.

formation on the prints forms the basis for specifications which should be placed in the hands of welding operators before they start to deposit any weld in any case. It merely puts on a sound, scientific basis the control of the important function of joining together the parts which make up the units of machinery produced. This is entirely an engineering function

and should not be expected of men without some engineering background.

After such a degree of control has been established, as had been described in the foregoing paragraphs, a welding manufacturer can set up reasonable and sound manufacturing schedules and also may establish sound cost analyses on every item of his equipment. When such control

has been established to the extent that all phases are covered, including scheduling and accounting, the proper objective of specifications and of control have been accomplished and the manufacturer may go ahead on a truly sound economic basis on whatever phase of the work he wants to start, simply by analyzing the information he has in hand.

Longer Tool Life by Hand Stoning

HILE it may be impossible to see with the naked eye the roughness in the edge of a tool ground on the ordinary 46 to 60-grit wheel, when examined under the microscope, the edge will appear as in Fig. 1 for a milling cutter tooth. It is evident that the peaks shown, small as they are, bear the heaviest load and break off, leaving flat relief surfaces that rub the work and generate heat.

If after grinding, this same edge had been stoned with an India (aluminum oxide) oilstone, the edges would appear as an unbroken line as illustrated by the microphotograph, Fig. 2. Four steps in refinement of

FIG. 1—Cutting edge of a 2¾ x¾ in.
milling cutter as commonly reground
with a coarse wheel. (100 x).



FIG. 2—The same milling cutter tooth surface as shown in Fig. 1 after it had been hand stoned on the face (100 x). A good cutting edge should be as nearly an unbroken line at the juncture of the two planes as is possible to obtain.

edge are possible through selection of coarse, medium and fine India stones or of hard Arkansas oilstones. All that is required is a few light passes to produce such a fine surface which results in better cutting and longer tool life. At the first sign of dulling, a simple restoning without removal of the cutter from the machine will in many cases restore it to prime condition. Ultimately, of course, the tool will have to be reground because the tool will have lost its original cutting angles.

If the ultimate in fine hand stoning is desired, hard Arkansas oilstones can be used, but these natural stones should be employed only after the cutting edge has been finished ground with a fine grit wheel, such as a 320grit wheel. In one instance, where 67 magnesium parts were being end milled between regrinds of the cutter, by stoning the same cutter with a hard Arkansas stone, Fig. 3, cutter life was increased to 280 parts between regrinds. The cut was 0.15 in. deep on one side of the piece and 0.25 in. on the other. Other instances of hand stoning with a hard Arkansas wheel after a refined grinding with a 320-grit Aluminum wheel showed improvement of 100 to 300 per cent increase in production between regrinds, with less power consumption and greatly improved finish

. Wheels used for finishing cemented carbide tools are generally quite fine as compared with those used for sharpening other types of cutters and this is one of the reasons for the good results obtained from carbide tipped tools. When only slightly dulled in service, such tools may be touched up by hand and their cutting life between grinds thereby prolonged. This stoning is done with a diamond hand hone or a Crystolon

(silicon carbide) stone, without removing the tool from the machine.

Another application of hand stoning is to remove the slight burr or wire edge often found on new tools when removed from the carton. A light pass along the edge of the tool will in a great many cases greatly lengthen the period between resharpenings.

Hand stoning is capable of producing such results in all classes of cutting tools, whether they be milling cutters, drills or single point tools. Any properly sharpened tool can be made to produce more effectively by this refinement in finishing the edges. India and hard Arkansas stones are available in a variety of shapes to suit particular jobs.

Photographs by courtesy of the Behr-Manning Corp., Division of Norton Co.



FIG. 3—End milling cutter being hand stoned with a hard Arkansas oilstone.

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Four Tables Feed Aircraft Press

By S. H. BRAMS Detroit Editor, THE IRON AGE

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CTAMPING of small aircraft parts of aluminum has been immeasurably speeded at the Conner Avenue plant of Briggs Mfg. Co., Detroit, by adopting a large press to continuous operation, utilizing four die tables which feed to the press in continuous succession.

The entire installation somewhat resembles the letter "H," with a Clearing hydraulic 2500-ton press assuming the position of the center bar of the "H." Each side upright of the "H" consists of a platform holding a table, on which aluminum blanks are placed over forming dies. Each table moves on tracks into line with one side of the press, and then the die tray itself is automatically conveyed into the press for the forming operation.

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A variety of die trays is used in operation as manufacturing this schedules require, producing from 4 to 10 pieces per cycle. One such tray goes into the press approximately every 30 sec., and on some 8-hr. shifts as many as 7000 pieces have and into a track continuation on the press bed.

Two women operate at each table station, setting blanks on the dies, covering them with rubber blankets to distribute the pressure, and removing the finished forms after the operation.

This press can be operated as a toggle press but the present utilization is for single action. It is capable of piercing, blanking and forming and doing all other customary press operations. It is actuated by a 300 hp. motor which pumps hydraulic fluid down a main 31-in. pressing cylinder at a pressure of 3000 lb. per sq. in.

Also interesting and newly installed in this plant is a "shaker" for aircraft wings. Aircraft plants occasionally find that completely assembled wings may contain loose rivets, chips, scrap and perhaps even tools within them, and the "shaker" was devised as the quickest means of removal of any foreign element.

A wing is loaded on this device

with the open side near the floor, secured at the bottom through the wing extension fasteners. The wing top is held in place by leather belting. The sides of this holding fixture consist of ordinary pipe.

The "shaker" is operated by a 4

hp. motor geared to an eccentric cam. In operation, a rather severe shaking action ensues during which any residue within the wing falls out.

These illustrations show two phases of operation of the four-table press described on this page. Fig. 1 shows one platform in press position, its die tray going along its tracks into the machine. At the left another crew empties its tray of newly-fabricated parts. Each container in foreground houses a motor actuating the adjoining table. Each die station is overhung with a shelf on which blanks are held pending use, and open space is provided on the outer half of each table and on the motor containers to hold finished stampings until they are removed to storage.

In Fig. 2, taken from an elevated position, a tray of formed aluminum pieces has just been returned from the machine. A supervisor is handling one of the pieces, while an operator starts to remove the rubber blanket over another part. At left in this picture another tray has been arranged by a two-woman crew, and will move forward on its platform into press position while the platform at right is withdrawing.



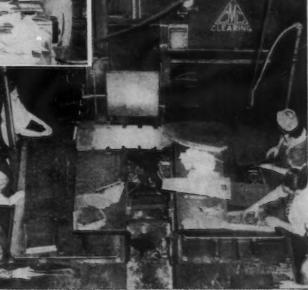
been turned out from this one press alone.

Each table is equipped with a 2 hp. motor. In the first phase of movement of the table, the motor shaft extension engages a rail running alongside the press, moving the table forward until it comes to an automatic stop at the end of its travel. Operators and platform move in this phase with the table. The same motor then engages a shaft moving the tray along tracks at the top of the table, running at rightangles to its previous travel direction ABOVE

FIG. I—One platform in press po-sition, its die tray going along tracks into the machine.

RIGHT

FIG. 2—A tray of formed aluminum pieces, just returned from the machine.



Metal Cleaning Before I

... Summarizing his observations and research since 1917, the author discusses drawbacks, advantages, equipment and functions of the major metal cleaning methods, including the controversial solvent vapor degreasing process.

CLEANING of metal surfaces prior to processing can be divided into abrasive, solution, emulsion, electrolytic cleaning, and solvent vapor degreasing.

Of the abrasive cleaning methods, sandblasting is pretty well cut and dried. Sanding leaves the surface rough or matted. It provides teeth for subsequent protective and decorative coatings. Some appreciable amount of subject material is always removed, therefore it cannot be used on dimension shapes. It leaves the surface in a very active condition, subject to corrosion or oxidation, and must be followed immediately by other treatment.

Scrubbing processes are not always satisfactory. Abrasives applied with bristle or wire brush or steel wool are always quite harsh. Assembled parts often combine materials which are not all equally resistant to abrasion: the scrubbing action of wire brushing is effective for removing tough, strongly attached foreign matter, but the disadvantages are many. Care must be used in applying the brush; hand labor is involved, and experience is the first requisite of the operator. At present it is particularly difficult to achieve satisfactory results with any process employing hand or power brushing with or without abrasive materials, either wet or dry.

Again, brushing with a slurry is employed to remove surface dirt while protecting the metal itself; for example, in cases in which metal becomes coated with contamination over part of its surface. These portions may be cleaned with a slurry of mate-

rials such as emery, silica, aloxite, rotten stone, etc. A continual application of slurry while scrubbing permits the material to be flushed off periodically. Suspension vehicles other than water, such as turpentine, kerosene, and the like, which are cleaners in themselves, are often used. A mixture of turpentine and pumice is sometimes useful in removing oxidation spots from soft metal sheets because turpentine, for instance, acts as a lubricant protecting the unoxidized portions of the metal as well as a vehicle for applying the polishing substances.

Solvents

Innumerable solvents are on the market and more are being developed daily, which is fortunate because some of the most generally used solvents are difficult to obtain. Petroleum solvents, alcohols, aromatics and terpenes are almost off the market for the ordinary user.

Even so, the available industrial solvents for war industry are almost too numerous to list. Perhaps the most familiar is the so-called Stoddard's solvent. It is a fraction commonly called mineral spirits, painters' thinner, and the like. These differ slightly, but can be used interchangeably. The flash point is about 105 deg. F. and the gravity is between that of naphtha and kerosene. It dissolves oils and greases and evaporates slowly. Its fumes are not very toxic and the danger from fire and explosion not too great. The cost is low and for many purposes it can be used over and over again. The two disadvantages often interfering with its use are these: After washing with Stoddard's solvent, a thin film of oil is left on the material. If the material is going into storage this is an advantage, but if it is to be processed immediately, the opposite is true. A second difficulty arises from the slow drying qualities of the solvent.

For special solvents required for definite jobs, the petroleum refiners are a great help. Their research departments cooperate in furnishing any numbers of solvents of various types, flash points, gravities, prices, and properties. One very powerful petroleum solvent with an aromatic hydrocarbon base and oil of citronella as one of the dissolving agents may become a substitute for carbon tetrachloride and other such materials.

A mixture of equal parts of alcohol, acetone and ether is a powerful solvent, dries fast and clean, and requires very little rubbing, but it is hardly to be classed as a commercial cleaner. For some purposes methanol, denatured alcohol, benzol, toluene, and such materials may be useful in small quantities, but in general these materials are not for industrial use.

Conditions under which gasoline should be allowed make it prohibitive, but other petroleum solvents are not so inflammable and can be used under most plant conditions.

While safety solvents containing carbon tetrachloride are frowned upon by aircraft industries, because of the physiological effects often resulting from use of such materials, a mixture of 40 per cent CCl₄ and 60 per cent petroleum cleaning solvent is on the market and widely used for household cleaning. A cleaner recently approved by the Army has a flash point of 145 deg. F. One such cleaner is Union Oil Co. Thinner No. 9. Compared to common cleaners with flash points of 105 to 110 deg. F. this is relatively safe to use on metal parts and fittings.

The so-called safety-solvents are useful and effective in metal cleaning, and in the near future will likely be

Sixtieth in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

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Processing...

By KENNETH D. KAHN
Chemical Engineer, Lockheed Aircraft

inexpensive, safe, and more effective than anything now available.

Emulsifiers

In processing, metals come covered with several types of impurities, such as drawing oils and greases, rust preventives, ordinary factory dust and grime, oils and greases caused by contact with dirty hands, aprons and gloves, waxes, and smudge. The most widely used cleaning process for all of these is the dipping of the metal in hot alkaline materials, called by the general name of soaps. These are not really soaps, but are chemical solutions which have detergent action or a lifting action. They are usually employed in hot solution and followed by a hot water rinse. One of these materials is a mixture containing mostly sodium metasilicate to which has been added a very small quantity of organic wetting agent. Materials to be cleaned are immersed for 5 to 20 min. in the solution, which is heated to about 180 deg. F. The concentration of the solution is not very critical within the range of 2 to 5 per cent by weight. Any chemical technician will question such a wide range of concentration. If 2 per cent is correct, then 5 per cent must be too high; it seems odd that a solution can vary 21/2 times. It is true, however, that almost any concentration in this range will do the work. But a solution starting at 5 per cent and allowed to deplete by drag-out, with the solution replaced by plain tap water, will gradually reach a concentration which is ineffective. The advantage of the strong solution is not merely in the strength, but in the fact that it requires less attention and infrequent additions; but since the drag-out of a strong solution removes more costly solution than that of a weak one, high concentrations are to be avoided. In hot solution, low concentrations work practically as well as high, but additions of new material are required to be made more often as the effective range has been reduced.

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ning, y be Cleaners such as these do very well for removing most vegetable and mineral oils from sheet metal. Occasionally some contaminant is encountered which requires more drastic treatment. Usually it is better to employ some inexpensive bath such as a metasilicate solution which answers the purpose for 90 per cent of the material than to seek the perfect cleanser to cover all cases. A few special kinds of dirt can be removed by hand cleaning if necessary.

A distinct advantage of the type of cleaner mentioned is that the cleaning time is not too critical. Material left in too long through ignorance or carelessness is not apt to be injured beyond use. The top temperature of 180 deg. F. is not harmful to metal, and the hot mild solution is easy to dispose of in rinsing. Wetting agents added to the metasilicate should be of such type and quantity to produce good run-off and still not foam excessively. It is not unusual to add such common materials as sodium carbon-

ate for this purpose. Some of the organic wetting agents such as the esters of sulphonated maleic anhydride, and esters of sodium sulphosuccinate are often used. It is important that the percentage of free caustic be kept low. The hot rinse, which should contain enough chromic acid to maintain a decided acidic condition, leaves the metal in condition for immersion in the processes which follow such a chromodizing and anodizing.

Metals which can stand a more vigorous cleaning material permit the addition of caustic soda and trisodium phosphate dips, which are strong detergents. Care must be taken that they are not used with aluminum.

For steel cleaning, the solution of sodium metasilicates can be used, but the temperature must be high and a spray action is often necessary. While the chemist hesitates to admit it, he

PARTS cleaned by sand blasting. The parts placed in revolving wire baskets, inside a sand blasting cabinet.



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APOR degreasing in tube bending section at Lockheed. Tubes coated inside with grease from the bending operation are imboiling mersed in trichloroethylene, then suspended in the 18-in. vapor layer above boiling liquid until clean. At the extreme right the continuous still removes the grease from the solvent and returns clean trichloroethylene to be used over again in the Detrex degreaser.

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often depends on a strong scrubbing action of a stream of cleaning solution forced through an orifice to do what the cleaner alone will not do. There is a tendency to think of cleaning as a matter of pure chemistry; of emulsifying, dissolving, interaction of cleaning materials and dirt; but the more successful process is often one of compromise, in which the mixture is driven off with air pressure.

When steel parts are to be painted or plated following the cleaning, a slightly acid cleaner gives a better preparatory surface for paint. Often it is necessary to clean the steel with a strong alkaline cleaner, then rinse and dip in sulphuric acid solution and then rinse again, after which the surface is ready for plating.

In the case of alkaline plating solutions containing cyanides, care must be taken that the material does not carry over acid from the preparatory baths, because the action of acids on alkaline cyanide solution destroys the plating bath and produces lethal gas.

One short cut process for steel cleaning, where production schedules are forced, is as follows: The material is given a wash with a mild alkaline cleaner solution driven through nozzles by a pumping system. By the selection of the proper nozzles the flow can be either speeded up or reduced and the spray can be given any desired direction and shape. The metal is then rinsed by a water spray

and while still wet the parts are wiped with a cloth moistened in one of the proprietary cleaners on the market which contains both chromic acid and phosphoric acids. The chromic acid passivates the surface and the phosphoric acid gives a sort of parkerizing effect, and the combination dries easily to give a good bond for primers.

Brass and bronze parts may be cleaned in the steel cleaning solutions, but the immersion time must be carefully watched and controlled to prevent injury to the surface. In every case, careful rinsing is necessary. Magnesium is less sensitive to activity of cleaners than aluminum, and consequently may be given a wash with materials that are quite caustic.

Where a large tonnage of materials is to be treated, and the parts are comparatively uniform in size, it is economical to use parts washing machines. In this type of equipment the material is placed in baskets or on racks or hung on a conveyor monorail or on a conveyor belt, and the machine does the rest. Cleaners are scientifically applied with just the proper amount of spraying, rinsing and drying, leaving the delivery end of the machine ready for further processing. The machines are quite expensive, but when properly designed and engineered they constitute a very satisfactory equipment. In machine washing more dilute solutions are the rule, and solution control is much easier

than with open tank methods. The machine should be designed for the job to be done rather than for the purpose of using a certain material.

Electrocleaning

There are many advocates of electrocleaning, which might be defined as cleaning in hot alkaline solution with the aid of electric current. In general, the material to be cleaned serves as one pole and steel electrodes are inserted in the steel tank to serve as the other pole. There is considerable question as to whether the work to be cleaned should be made the anode or cathode. Both methods are used satisfactorily. It is now the consensus that in cleaning of steel the material to be cleaned should be made the anode, whereas with brass and zinc the articles to be cleaned are made the cathode. Usual current densities range from 10 to 100 amp. per sq. ft. and even more in some cases. After cleaning, steel should be given a quick dip in sulphuric acid. The temperature of the electrocleaning baths may be as high as 180 deg. F.

Solvent Vapor Degreasing

One of the most controversial cleaning methods is solvent vapor degreasing. As the name implies, the process consists of immersing the material to be cleaned in the vapor of a boiling organic solvent, or in the boiling solution itself or both.

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GENERAL view of anodizing chromodizing tanks at Lockheed. From left to right, are wash tank containing silicate cleaner, hot water rinse tank, chromodizing bath, anodizing tank and tank for final hot water rinse. Drying oven is at extreme right at floor level.

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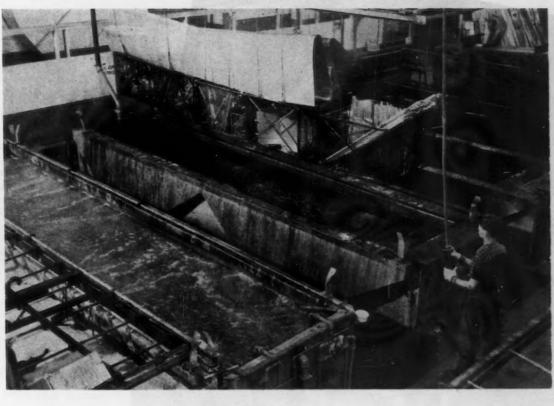
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One of the earliest materials used in this connection was carbon tetrachloride. Perchloroethylene or tetrachloroethylene is also used to some extent. In the cleaning of aluminum and steel parts the most universally used material is trichloroethylene (CCl2CHCl2) marketed under the trade names of Triad, Blacosolv, Permachlor, etc. A typical vapor degreaser is, actually, a large reflux condenser for the distillation and condensation of a liquid which is heavier than water and which forms a very heavy dense vapor. The equipment consists of a zinc-coated steel tank provided with a heating chamber at or near the bottom, and cooling surfaces near the top or at such a point that the depth of the vapor phase or layer is closely established. Degreasers are also made of stainless steel, but the cost prohibits general use of such an alloy.

For sheets, flat and pre-formed parts the material may be loaded into a steel basket and lowered into the vapor above a boiling solution. The vapor condenses on the cold surface of the metal, lifting the dirt off of the metal and allowing it to run down into the boiling mass with the condensate. The metal thus cleaned is brought up to a high temperature by the contact with the solvent vapor and when drawn up out of the tank is clean, warm, and dry. The total operation takes about 5 min., including travel time.

The trichloroethylene is a moderately stable compound up to 256 deg. F. It is affected by contamination, and the contamination and moisture brought into the solvent must be removed by some means. As the vapor degreaser is usually used to clean aluminum parts, there is generally present a great deal of powdered or granular aluminum filings and dust. This contaminant has sharp edges. When for some reason there is formed any aluminum chloride as for instance might be the case if a minute amount of trichloroethylene decomposed, a practical example of the well known Friedel-Crafts reaction which proceeds rapidly throughout the solution, results. Other chlorides, especially iron, will cause the same reaction to take place, which explains why the tank is zinc lined. Zinc salts do not seem to have any deleterious effects on the solution. It is hard to believe, unless a solution has been seen to go sour, that a batch of solvent costing several hundred dollars can be in perfect condition one minute, and in the next few minutes a total loss. And not only that, for when a batch of solvent decomposes. the tank cleaning job that follows is no joke.

The solvent costs in the neighborhood of 90c. per gal. and a machine 4 x 12 ft. will contain 500 gal. of solvent. Accessories to the vapor degreaser are many and varied, the most common ones being the rectify-

ing still for recovery of clean solvent for further use, a slush-gun which is merely a nozzle, hose and pumping outfit for spraying stubborn dirt off the metal, water traps, pumps, and a fan and exhaust system which will remove about 25 to 50 gal. of solvent a day from a machine about the size mentioned above. The loss by evaporation and exhaust is a costly item in itself.

The control of the solution is accomplished by titration and by pH tests. Such tests merely show the condition of the stabilizer in the solution, but the experienced operator watches them, together with the appearance of the bath, characteristic smell and the color of the bath and the general consistency of the solvent. In a really good installation, the degreaser is hooked up direct to a still which continually refines the solution and returns it either to the tank or to a storage compartment according to the wishes of the operator. The whole outfit can be gas fired, or steam or electrically heated. The danger from fire is low because trichloroethylene does not burn readily. However, when it does burn there is formed a deadly phosgene gas.

Considering the remarkable results obtained with the solvent degreaser and the low overall cost when properly operated, probably no other process yet perfected can compare with it for use under present conditions.

Machining

LEFT

FLY cutters with cemented carbide inserts about 3 in. long have been found superior to conventional straddle-milling cutters in machining the blades of aluminum alloy impellers for airplane superchargers at General Electric. The cemented carbide inserts last five times longer between regrinds than the multitooth milling cutters of high speed steel previously used.

BELOW

THE upper edges of the blades are bent to correct curvature by a forming punch die in a pneumatic press. Each blade is "curled" individually, the rotor being hand indexed between press strokes.

ABOVE

N the initial operation the impeller is held in a fixture and hand indexed to machine each blade individually. The carbidetipped fly cutters spaced at opposite diameters of the cutter barare used in a second miller to remove the metal remaining in the triangular are as between the blades from the first cut. The shape of the pads of metal to be removed requires that the work be oscillated to give a wider sweep at the outer ends of the cut. To accomplish this, the impeller is mounted on an arbor oscillated by a universal shaft.

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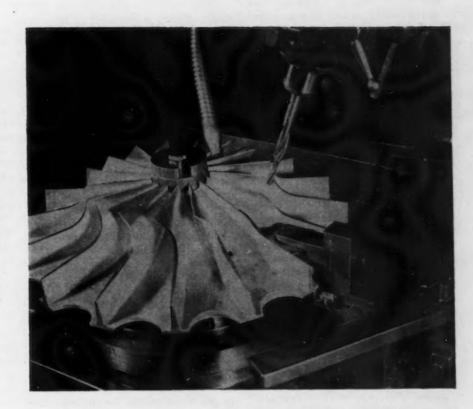
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Supercharger Impellers at General Electric

RIGHT

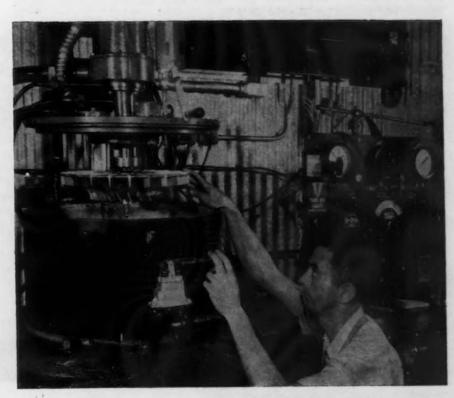
THE impeller is next transferred to a milling machine equipped with an angular head, and a hole is drilled and countersunk with a combination tool in the web at points midway between blades. To do this, the work is located on a vertical arbor on the bed of the machine and is indexed by hand prior to drilling each hole. The work is located after each indexing by a slide (right) with a block of fiber at its inner end tapered to fit between the side faces of the blades.



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RIGHT

MPELLERS for airplane superchargers "grow" 0.003 in. when they are tested in this specially constructed heavy steel case at speeds of more than 20,000 r.p.m. Centrifugal stresses set up are of a magnitude to make the aluminum alloy impellers take on a permanent set and become 0.003 in. larger in outside diameter. The test case is exhausted to a high vacuum so that the power needed to drive the impeller is relatively small.



THE IRON AGE, September 9, 1943-67

Forming Acrylic Resin Sheets

ANY materials have been suggested for use in making dies for the forming of acrylic resin sheets, such as Lucite or Plexiglass. They have been tested and nearly all of them have some decided disadvantage or present problems in their use. Though apparently a rather simple process, the forming of such sheets involves many problems that make it necessary to have a die material of specialized properties. For example, the material must have a rather low coefficient of heat transfer. If this is not the case, the acrylic resin sheet stock may be cooled at variable rates and thus produce strains in the finished product. For the same reason, it is essential that the material have a constant coefficient of heat transfer in order to avoid strain lines

The die material must not be affected greatly by heat. It must be able to withstand the effect of a hot sheet of methyl methacrylate being formed over it every few minutes for a period of months or every few days for an indefinite period of time. It cannot be softened by these treatments and should not break down rapidly in any other way. It should be reasonably dimensionally stable and tough enough to avoid breaking with ordinary handling.

Until recently the best materials for use in the forming of acrylic resin sheets were plaster of paris and wood. Plaster of paris makes a rather good die, but it has a limited application because of its tendency to be dehydrated by the heat of the sheet stock as it is applied on forming. This tendency causes chalking and cracking to occur on the surface of the die. However, plaster of paris molds are inexpensive and are easily made, and they are undoubtedly the best from a cost standpoint where comparatively few parts are to be made on the die involved. If a greater number of parts are to be formed, the replacement cost of the plaster of paris dies becomes important and other die making materials must be considered.

For exceedingly long runs the cost of metal dies can be justified. These have some very definite advantages. By DR. K. J. LEEG Baker Oil Tools, Inc., Los Angeles

They are dimensionally stable and can stand considerable abuse without changing shape. Their disadvantages are their cost and their high thermal conductivity. With an aluminum die, for example, at the beginning of a production run the die tends to remove the heat from the acrylate sheet very rapidly and frequently will cause strains to appear in the formed parts. As the production run continues the die approaches the temperature at which the acrylate sheet is applied to it. As it does this it tends to absorb the heat from the plastic sheet and act as a reservoir, thereby slowing the forming cycle. Due to these disadvantages very few metal dies are now being used in forming acrylic resin sheet stock.

The next important material used in dies is hard wood. It can be readily machined to the desired contours and is comparatively inexpensive for mold making. It has excellent properties as a forming material and in general will produce very satisfactory parts. The only important disadvantage to the use of wood dies is due to the fact that they are made by glueing together blocks of wood, and occasionally when the die is being run repeatedly for long periods of time the glue will soften and impregnate the covering cloth, in some cases only coming part way through the cloth. When it does this it changes the coefficient of heat transfer in this particular area and causes strains to appear in the formed plastic parts. This is a twofold disadvantage in that the strains are not noticeable until later when they may show up

Phenolic Casting Resins

Comparatively recently, liquid phenolic casting resins were suggested and tried as mold materials for forming of the acrylic resin sheet stock. They seemed to have all the qualities of an ideal material. The cost of making a die was usually less than for making a wooden die. This is true because the material is easily handled and can be cast to size and shape in a simple plaster mold. Thus

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FIG. I — A large male and female mold for forming acrylic resin sheet, the female portion being a phenolic plastic casting. The I-ft, ruler on top of the mold gives an idea of the size of the casting.

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68-THE IRON AGE, September 9, 1943

With Plastic Dies ...

the labor is but little greater than is required for the molding of plaster of paris. In the first dies that were used for this purpose 25 per cent walnut shell flour was usually used as a filler. The results were excellent. These dies were generally small convex shapes for forming by either laying the hot piece of acrylate sheet stock over the gradual contour or by bending the stock over the die and holding it by clamps during the cooling of the sheet. In general, the dies were rather small in size and were solid. The success of these dies led to far larger dies being made of the plastic. After many convex shapes had been made, certain large concave dies were made for use in forming the plastic sheet by stretching. This is done by blowing the hot sheet into the mold with air pressure, or by evacuating the air from the mold and drawing the sheet into the cavity. Very large sections of this type were made and at first were apparently quite satisfactory.

Shrinkage Stress Failures

After these dies had been in use for a few weeks the concave shapes, . . . Liquid phenolic casting resins with asbestos filler are now being successfully used in West Coast aircraft plants as a die material for forming transparent plastic sheet parts. For other uses of similar materials, the reader is referred to the article by the same author on "Plastics in Production," in the Feb. 12, 1942, issue of The Iron Age.

in some cases, began to crack. This condition was traced to two causes: It was caused partly by thermal coefficient of expansion because the hot acrylic resin sheet heated the surface of the mold while the back of the mold remained at room temperature, thus a variation of expansion existed between the two surfaces of the mold. This produced strains. The second cause was the aging shrinkage of the plastic which occurred more rapidly at higher temperatures and therefore occurred to a greater degree on the forming surface. As this shrinkage continued, greater and greater stresses developed in the plastic due to the variable shrinkage, and eventually cracks appeared.

Certain grades of asbestos can be used as a filler for the plastic and they produce a material with a thermal coefficient of expansion approximately one-third that of the

walnut shell flour filled plastic. The rate of aging shrinkage of the asbestos filled plastic is approximately 25 per cent of that found in the walnut shell flour filled plastic. These two factors both work in the direction of avoiding the difficulty encountered in the early molds. Molds were made using 8 per cent asbestos as a filler and were put into production runs. Some of them have been in use for well over six months with no sign of breakdown as yet. Two views of a large mold of this type are shown. As can be seen in the illustrations. dies of very large size are being used with success. The success encountered in dies made with the asbestos filler has led to this plastic being recommended for acrylate forming dies in general where intricate contours are encountered, and it is safe to count on excellent results from the

Manufacturing Procedure

The process for making dies is as follows:

1. A pattern is made of plaster of paris, wood or modelling clay. This pattern is coated with oil, stearic acid or some other suitable parting medium, and plaster of paris or hydrocal is poured over the pattern, thus making a negative of the shape required. To this negative mold are then applied several coats of lacquer. It is essential to have a heavy lacquer coat on the plaster of paris mold in order to avoid sticking of the plastic die to the plaster of paris. Lacquer films are quite porous and unless they are rather thick the plastic tends to penetrate the pores and stick to the plaster. In some cases it has been found to be less expensive to make a negative pattern, instead of making a positive pattern and a negative mold of plaster of paris. This is done by simply determining the negative of the shape desired and making the pattern in this form. The resulting negative pattern is then a mold for



FIG. 2 — An open view of the famale mold shown in Fig. 1.

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the plastic which is cast directly into it. This negative pattern can be either plaster of paris or wood. When wood is used the usual care must be taken with the lacquering in order to avoid sticking. If it is desired to hurry the production of the plastic die, the lacquered forms can be dried in a slightly warm oven, taking care to avoid the possibilities of solvent explosions. Additional time will be saved by the fact that the warm mold will speed the setting rate of the plastic.

2. The volume of the mold is calculated and from this calculation the weight of plastic needed to fill it is determined. Since the final plastic will have a density of approximately 1.2, there will be required 1 lb. of plastic for every 23 cu. in. of space.

3. After determining the weight of plastic required, the weights of the various constituents are determined on the basis of the final plastic being 82 per cent resin, 8 per cent asbestos and 10 per cent catalyst, all by weight.

4. The calculated amounts of resin, asbestos and catalyst are carefully weighed out in separate containers. If the die is to be of such size that the plastic cannot be all mixed at once, it is entirely satisfactory to make several mixes and pour them consecutively into the mold. If this is done fairly rapidly, that is, allowing not more than 15 to 20 min. between pours, there will be an excellent bond between the various pours and no apparent variation in physical properties across the weld.

In mixing the plastic, the catalyst is added to the resin and stirred slowly and thoroughly. It is important that the catalyst be thoroughly mixed with the resin before the filler is added, because the filler increases the viscosity of the mix and this increases the difficulty of thoroughly mixing the catalyst with the resin. This may lead to portions of the plastic having no catalyst in them which will keep these portions from setting at the usual rate. As a result soft spots will be found in the casting. In order to insure the mixing being thorough throughout the container, it is important that the sides be scraped

down to remove any film of uncatalyzed resin. After the resin and catalyst are thoroughly mixed, the filler is slowly added and mixed in by slow agitation, with care being taken to avoid the incorporation of large amounts of air.

5. When mixing is completed the whole plastic mass is poured into the mold. There is always ample time for this operation because the plastic increases in viscosity rather slowly. Under ordinary conditions about 30 min. may elapse between the addition of the catalyst to the resin and the pouring of the plastic into the mold. In some cases where fine detail must be reproduced, it is advisable to brush the plastic into the mold, much as is done in the pouring of plaster of paris. This is not generally necessary, however, in the making of dies for the forming of acrylate sheets. When the mold has been filled with plastic, it may be left for a few minutes to allow air bubbles to rise, before it is placed in the oven.

6. When the plastic has increased in viscosity to the point where it is apparent that no more air will come out, the mold is placed in the oven at a temperature of 175 deg. F. and baked until cured. The time required for this curing process varies with the type of material used for the mold and its thickness. Most small castings are made in comparatively thin molds, and therefore will usually cure in 2 hr. at 175 deg. Extremely large castings, on the other hand, sometimes require as much as 8 or 10 hr. for the curing process. It is not possible to accelerate the curing by increasing the temperature, because the plastic may boil if it is placed in an oven at temperatures much above 175

7. When the plastic is cured it is removed from the oven and allowed to cool. When cooling a slight shrinkage occurs, about 0.0025 in. per lineal inch, and therefore the casting will often free itself from the plaster mold. This is particularly true if a heavy coat of lacquer has been applied. When the die has cooled it is removed from the plaster and usually is ready for use. If the plaster of paris has stuck to the plastic in any

spots, it can be removed by scraping. After any necessary clean up, the plastic die is usually covered with felt just as wood dies are, and is then ready to be put into production. Or if the die is to be used with a coating of grease, any necessary fittings can be installed by drilling and tapping the plastic and bolting fittings to it.

Cuts Like Hardwood

For various reasons it is sometimes necessary to work a die to a different contour after it has been cast. In some cases, also, it is necessary to incorporate metal inserts or make other changes in the finished castings, From this standpoint it is interesting to note that the plastic can be worked with woodworking tools. It handles much like hardwood except that no grain is encountered. It is somewhat harder than most hardwoods and tends to dull tools more rapidly than they do. However, it can be sawed, filed, scraped, drilled and even planed to a contour. If changes are necessary a rough shaping job can be done on the plastic and it can then be smoothed up with sand paper and finally with polishing compounds until the new contour can be made with as highly a polished surface as the original cast surface. Thus, it is possible in many cases to reuse a die when changes in its shape are necessary.

While the cost of the finished plastic, when made with asbestos, is greater than that of the walnut shell flour filled plastic, it has so many advantages in this particular application that it is advisable to use it exclusively. Savings realized in the manu facture of dies out of cast phenolics are such that the cost of the plastic is a minor item in determining the cost of dies in general. This is particularly true where double contours are encountered and it is in this field of application that the cast phenolics are superior to other materials. Appreciable savings can be realized by the use of plastic dies for the forming of acrylic resin sheets even when comparatively few parts must be formed on each die. This saving increases with the number of parts to be formed.

"Annealing of Steel" Corrections

IN the five-part article, "Annealing of Steel," by Peter Payson (THE IRON AGE, June 24, July 1, 8, 15 and 22) several typographical errors were made. In the issue of July 15, page 70, reference to Fig. 26 should have been to Fig. 7. In the same issue,

page 74, caption to Fig. 32, the austenitizing temperature should have been given as 1650 deg. F. instead of 1050 deg. The caption of Table II, page 67, July 22, should have read, "Effect of Austenitizing Time on Hardness of Chromium Bearing Steel";

the last two words were inadvertently omitted. The inconsistency in use of "microphotograph" and "photomicrograph" was not Mr. Payson's. In each case the word should, of course, have been "photomicrograph."

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Labor Laws for

Government Work

OW that so much industrial capacity is devoted to war production, many employers find that some or all of their operations are subject to the Walsh-Healey Public Contracts act. Like the Wage and Hour law, this act deals with labor standards. It applies generally to U. S. government contracts for materials, supplies and equipment above \$10,000.

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The minimum wages required under the Walsh-Healey Act are those prevailing for specific industries in specific localities, as determined by the Secretary of Labor. So far such wage determinations have been made for 56 industries with wage rates ranging from 30 to 70c. an hr. The minimum wages applicable to particular products and localities are included in the terms of each contract when it is awarded.

For example, since May 27, 1940, the iron and steel industry has been subject to the following minimum wages:

Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and part of West Virginia: 45c. an hr.;

Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming: 60c. an hr.;

Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and East St. Louis, Ill.: 58 1/2c. an hr.;

Connecticut, Delaware, District of Columbia, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Wisconsin, part of West Virginia: 62½c. an hr.

Apprentices may be employed at lower rates if their employment con-

... Employers making war materials must conform not only to the Wage and Hour law, but also to the Walsh-Healey Public Contracts act, which in some respects differs from the general wage and hour requirements.

forms to the standards of the Federal Committee on Apprenticeship.

Basic straight-time hours of work under the Walsh-Healey act are 8 in any one day or 40 in any one week. Overtime is permitted, of course, if time and one-half the basic rate is paid for it. For example, an employee whose total workweek consisted of four 10-hr. days would be entitled to 8 hr. at time and one-half under the Walsh-Healey act. Under the Wage and Hour law, which makes the work week its standard, he would not be entitled to such overtime since his hours of work in that week did not exceed 40.

Where an employee worked five 10-hr. days and one 5-hr. day during the week, he would be entitled to 15 hr. at time and one-half under either law. But employers who enter into certain collective bargaining agreements with their employees pursuant to provisions in the Fair Labor Standards Act, may employ them up to 12 hr. a day or 56 hr. a week without the payment of time and a half for overtime.

Formerly the Walsh-Healey act generally prohibited the employment of boys under 16 and girls under 18 years of age. To facilitate production of war materials, employment of girls between the ages of 16 and 18 is now permitted. They may not work more than 8 hr. in one day, nor on a night shift, nor in dangerous or hazardous occupations.

Walsh-Healey is the only Federal statute which fixes safety and health standards for manufacturing industries. These are the principal hazards which inspectors will look for: fire hazards; unguarded cutting machines and unguarded power transmission machinery; faulty ventilation and illumination; unsanitary shop, washroom and other facilities. A pamphlet on these requirements, entitled "Basic Safety and Health Requirements," is issued by the Public Contracts Division.

Except in the case of certain deproduction associations, the Walsh-Healey Act requires that every contractor be a manufacturer of or a regular dealer in the materials or supplies to be furnished under a government contract. Where a dealer has a manufacturer deliver goods directly to the Federal government, he is considered an agent of the manufacturer and the latter's employees will be subject to the provisions of the Walsh-Healey act while they are engaged in any operation necessary to fulfillment of a government contract above \$10,-000.

In cases where a manufacturer buys materials or parts to be used in producing the commodity called for by his contract and it is a regular practice in his industry to purchase such supplies and not to manufacture them, the work performed by the vendor is not subject to the act.

This does not mean, however, that a contractor may avoid compliance with the act merely by shifting the work to a substitute manufacturer. In cases where the contractor turns over to another work which he would normally perform in his own plant, the

contractor is liable for any violations of the Walsh-Healey act which occur while the sub-contractor is preparing materials that are used to fulfill the government contract.

Nothing in the Walsh-Healey act prevents meeting a government contract out of stock on hand or manufactured before the contract was let. Thus it does not apply retroactively. The act does apply, however, to employees who do further work on such material, either in processing or packing and shipping the goods after a contract is awarded.

If a concern operates more than one establishment, each plant or unit is considered separately so far as coverage under the Walsh-Healey act is concerned. The act is applicable to all departments and employees of an integrated establishment.

It may happen that an employee does both commercial and government work in the same payroll or workweek. In such cases he is entitled to at least the basic minimum wage for all hours worked that week unless accurate records segregate his work on the contract from his other work. He is also entitled to time and one-half for all overtime worked in that week. Thus the overtime provisions of the Walsh-Healey act always apply to an employee for the entire week in

which he performs any work on a government contract subject to the act. The Walsh-Healey act does not apply to office and supervisory employees and maintenance workers. The last includes such employees as electricians, elevator operators and janitors. A foreman who performs no manual work and has no direct physical contact with the goods furnished the government is exempt even if he occasionally lends a hand in the course of his purèly supervisory duties.

However, many workers who are exempt under the Walsh-Healey Act may be covered by the minimum wage and overtime provisions of the Fair Labor Standards Act; these include clerical help, stenographers, receptionists, and the like, and maintenance workers such as elevator operators, charwomen, janitors and watchmen.

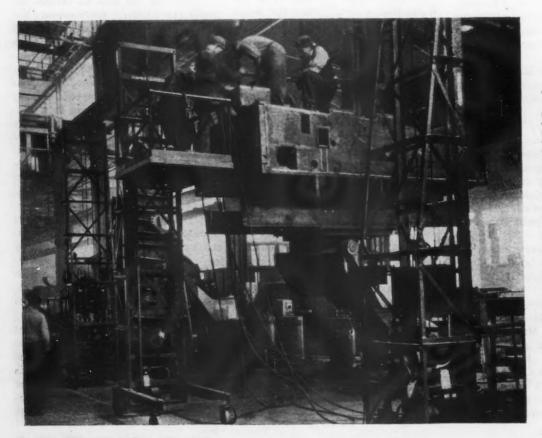
The Walsh-Healey Act and the Wage and Hour Law have much in common. The Wage and Hour Law applies to employees engaged in interstate commerce or in the production of goods for interstate commerce. Unless specifically exempted by the act all such employees must be paid a 30c. an hr. minimum and not less than time and a half their regular rates of pay for all hours worked beyond 40 a week. There is, of course, no limita-

tion whatever on the number of hours employees may work, provided overtime begins at 40.

The enforcing agencies for these two statutes have been merged as the Wage and Hour and Public Contracts Divisions of the U. S. Department of Labor.

Education and voluntary compliance have played a large part in the administration of these two laws, but for uncooperative employers the acts carry strict penalty provisions. For wilful violators of the Wage and Hour Law these include a fine up to \$10,000. and, in the case of a second conviction, imprisonment up to six months, a fine or both; persons may be enjoined from shipping in interstate commerce goods produced in violation of the act. Failure to comply with the Walsh-Healey Act results in cancellation of the contract, and, where flagrant violation is found, employers can be blacklisted from Federal contracts for three years.

One function of these two statutes has been to avoid the chaotic labor market of 1917-18, when government agencies had no uniform labor policy, and when pirating, strikes and stoppages dislocated industry. The newspaper headlines on labor of 25 years ago were none too reassuring.



TO prevent exposure of worters to the hazards of being perched on a ladder or on a ordinary platform, the movement of which the operator cannot direct, a large boilt and tank company has installed a number of electrically propelled portable lifters lite those shown in the illustration. Such a machine provides a safe and convenient means of accommodating welders who down-weld large assemblie carried on positioners. The platform may be moved up and down to any level starting at 16½ in. above the floor and to a maximum elevative of 12 ft. by means of a pumbutton control. Li'ting capacity is 500 lb., the speed of travel approximately 25 ft. per min., with the lateral movement of the machine an ordinary walking speed. These lifters are made by the Economy Engineering Co., Chicage.

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Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.

Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.

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BACK THE ATTACK WITH WAR BONDS . LET'S OVER-SUBSCRIBE THE 3RD WAR LOAN

Assembly Line . . . STANLEY H. BRAMS

• Fisher establishes aircraft development section: Don Berlin heads activity . . . Murray workers crash gates in new tactic by labor . . . G. M. and auto union begin contract discussions.



ETROIT — Events with rather interesting post-war connotations are taking place these days in General Motors. The sum total of the inferences is that postwar manufacturing activity in the aircraft field may be concentrated in the Fisher Body division.

The prime basis for such a conclusion is the establishment of a new aircraft development section in Fisher, and the transfer of Don R. Berlin from the corporation to Fisher, as its director. Berlin came to General Motors about a year ago and joined the staff of O. E. Hunt, manufacturing vice-president to take charge of aeronautical activities. As the designer of the Curtis P-36, he brought to General Motors a wealth of aeronautical background, plus indication that G. M. was really serious in its planning for prospects in the sky. His move to Fisher would seem valid evidence that the corporation has decided to centralize the type of work he does in its body-building branch.

Berlin has designed a new fighter ship, on which the Army is reported to have approved prototype construction. The building of the prototype is said to have begun; and if it proves out in its tests it will probably be manufactured in volume. Locale could logically be the Cleveland Fisher aircraft plant, where plans for heavy bomber assembly were recently discontinued.

Little is known about the General Motors fighter, whose development may mark a new milestone in the automotive entry onto the aircraft scene. Likely expectations are that inasmuch as it is a G. M. development it will be powered by an Allison motor. But even this cannot be confirmed at this time.

Whether any new ship will come into production in time to join the battles of World War II remains a large question. But the course of the war gives indication that new planes now on the drawing boards will be postwar products, rather than factors in victory.

DETROIT, where the fashions of labor problems are molded with the ingenuity of pre-war Parisian designers, has a new one—the crashthe-plant labor dispute. This new style in labor problems ran its course last week in the main plant of Murray Corp. of America.

Operations at this plant are at established time rates; the widely-described incentive plan first reported here (THE IRON AGE, p. 60, Apr. 29, 1943) is operative only in the branch plant at Ecorse. Until recently the main plant operated on an 8-hr. shift, during which the men had a half-hour for lunch on their own time. An agreement concurred in by both company and union was approved by the WLB, providing for a 9-hr. work day which included a paid 15-minute period for lunch. Murray interpreted the proviso to mean that any tardy return from the lunch period would revert the worker to the previous 30min. unpaid lunch hour basis.

This met no favor among workers who failed to get back on the job in time. Approximately 9500 workers walked out on strike when this interpretation was first enforced, and returned the next day under a truce. Then, in evident deliberate action. several hundred workers overstayed their 15-min. lunch period; and when the gates were closed and plant protection men sought to take badge numbers as they reentered through the gates, the workers formed a Roman phalanx, shoved aside the guards, and broke their way in. One group of about 50, isolated at an outlying gate, was brought back into the plant by a union flying squadron dispatched to the scene.

Not content with this brazen action, the afternoon shift, acting on mimeographed orders from the union local, assembled at 3:00 p.m. instead of 4:30 p.m., the new working hour, pushed into the plant and started work. The announced union policy thenceforth was to disregard the new 9-hr. schedule entirely and return to the old 8-hr. basis with a half-hour of unpaid lunch time. This policy was ordered discontinued by the regional WLB office, which uphheld the company stand in a hearing late last week.

This is a most remarkable example of the evil effect of enforced diffusion of management responsibility into the rank and file of labor. Someone has to manage. If 9500 or more workers decide when they are going to work, and pay no attention to the dictates of management-or, in the case, of the War Labor Board which they were instrumental in founding-then nothing less than complete chaos can result. Demonstrations such as this one at Murray are proving time and again that organized labor is far from maturity to the point where it is able to undertake a joint share in management. This is extremely unfortunate, not only for management, but for the cause of organized labor and the cause of a nation at war.

On another labor stage, General Motors Corp. and the United Automobile Workers Union sat down last week to begin negotiations for a new contract. They did not sit for long. Both the union and the company had recommendations, and neither side thought much of the other's.

THE union demands were led off by a call for blanket pay raises, intended, according to recent remarks by union official Walter Reuther, to be preliminary to the setting up of industry-wide standards on wages. Also sought was some sort of sinking fund arrangement which would guarantee reconversion pay to General Motors workers. Beyond that, there were fairly routine contract change demands involving refining of seniority arrangements, changes in the grievance procedure, and others.

Quite obviously, General Motors



TODAY, as the forces of The United Nations are rapidly advancing their march into foreign shores, virtually the entire industrial output of America is concentrated upon this stupendous task.

More than any war in history, this has proved to be a war of tools. When we beat our military timetables today, we do so because the tool production exceeded schedules months ago.

We at "Greenfield" pay hearty tribute to the millions of average Americans who have helped to supply the varied equipment our armed forces need. When the "invasion" is ended, we can promise them that the new skills we are learning now will compensate for "doing without" by providing finer products for the peace-time world we all await.

- BACK THE ATTACK WITH WAR BONDS -

What's the quickest action you can take to shorten the war for that son, that friend, those former employees of yours who are doing the fighting? The answer is easy. Buy at least one extra Bond! It's the best possible investment you can make, for peace - and your own peace of mind.

GREENFIELD TAP AND DIE CORPORATION GREENFIELD, MASSACHUSETTS



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DETROIT PLANT: 5850 Second Boulevard WAREHOUSES in New York, Chicago and Los Angeles



has no say today in the setting of higher wage rates, and presumably told this to the union delegates at the start. That matter will probably be threshed out, as have been many such points in the past, in Washington. As to reconversion pay, neither General Motors nor any other company is likely to look with approval on any program which would commit them to provide leaf raking or any other work for employes during a necessarily slack period. The corporate stand probably is that it intends to reconvert when war ends at the fastest possible rate, and that it will provide as many jobs as equipment and customer demand can handle, and as soon as it can.

T is doubtful whether any settlement will be reached in the General Motors matter, or in any other major matter under discussion at this time, until after the annual convention of the union in Buffalo in about a month. A bitter internal battle is going on within the auto union for control, one of greater proportions than any since Homer Martin split with his board and broke the union into two segments. This current struggle is unlikely to go that far, yet, until it is settled on the convention floor, all officials will be seeking to demonstrate that they are fighting to the limit for their constituents.

WPB Termination Plans Discussed

Chicago

• • • Dr. Stanley F. Teele, deputy director of the WPB Procurement Policy Division told business men here, meeting last Wednesday as the War Problem School of the Chicago Association of Commerce, of the plans and thinking of WPB on the subject of contract terminations.

"The 'Quick Cash' problem of seeing to it that contractors receive cash promptly in order that they can quickly do something else will be met by the payments of the government in settlement of terminated contracts.

"Senator Murray has already drafted a bill which he proposes to introduce when Congress returns which provides that every federal department shall, within 30 days after the filing of a demand therefor by the contractor, pay to the contractor not less than 75 per cent of the amount certified by him to be due. Senator Murray's bill goes on to extend the same right to subcontractors.

"The second proposal is for establishing a system of loans, guarantees of loans, somewhat along the lines of the present regulation V loans. Under such a proposal, which is authorized by Senator Murray's Draft Bill and also by a bill introduced in the house by Congressman May, the terminated

war production contracts of a company, of the inventories, receivables, and other assets resulting from the contracts, would be the basis for a loan, guaranteed by the government or made directly by it.

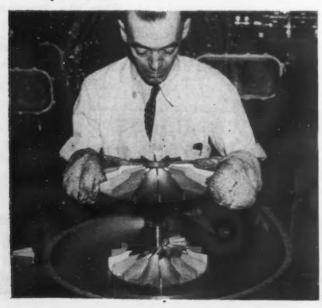
"The third proposal is that the government be authorized by legislation to purchase the rights of subcontract-tors against their customers.

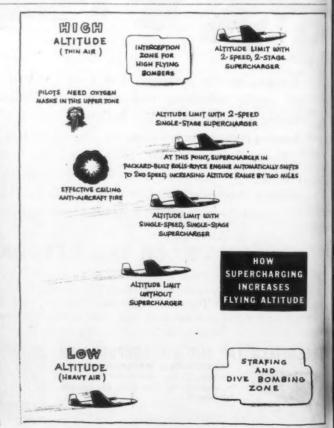
"The second specific problem is that of money payments to workers laid off because of termination of contracts. I believe that we shall be faced with two alternatives, either to provide financial compensation to workers during the conversion period or continue contracts and taper them off gradually even after the need for the products has disappeared.

"The third specific problem is that of removing promptly from plants the raw materials, work in process, finished goods and machinery no longer needed because of the termination of contracts. In the draft of the uniform termination regulation there is a provision permitting the contractor to remove the store property at government expense if the government has not removed its property within 30 days of a request from the contractor to do so. On paper this seems to meet the problem, but we do not know whether it actually does so."

"OXYGEN MASKS" FOR PLANES: (Right) The chart shows how supercharging increases the altitude ceiling of the same plane equipped with the same engine, the only difference being in the amount of supercharging.

DOUBLE CHECK: With his bands protected in asbestos gloves, this Packard Motor Car Co. worker is double checking the fit of the two impellers which are heated prior to assembly on the splined shaft





ANOTHER LINCOLN PARK "First"

The Wear-Resistance of Cemented-Carbides

NOW AVAILABLE GAGE BLOCKS

Carblox-Lincoln Park's new cemented-carbide gage blocks -provide the means to greatly reduce the wear error in gage block use. Sets of gage blocks made of other materials, and which are used continuously as master or working sets for comparative measurements, wear rapidly and will show the same purpose.

caused by abrasion on the ends of the build-up. A relatively small amount of wear is caused by the wringing together of the blocks. Carblox used on each end of a build-up will act as protective anvils and prevent wear on the less wear-resistant steel blocks.

Carblox are practically non-magnetic and are highly resistant to rust or corrosion. Their high cohesive factor facilitates the wringing of thin blocks and eliminates the difficulties now encountered in wringing thin steel blocks.

original accuracy for a long period of time . . . will largely eliminate the customary necessity of checking blocks . . . will greatly increase the usable accurate life of all gage block sets . . . will reduce to a minimum scrap or rejections that might result from the use of worn gage blocks.

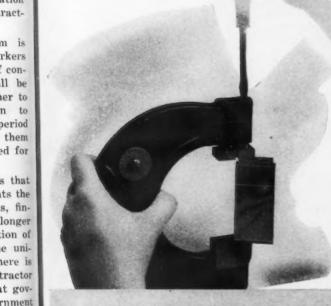
a loss in size of a few millionths to as much as several ten thousandths of an inch within a short time. Carblex will retain their accurate size within the allowable wear tolerance at least fifty times longer than steel blocks used for The greatest wear factor in the use of any gage blocks is

Carblox, with their high wear resistance, will maintain their

WRITE FOR COMPLETE DETAILS

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LINCOLN PARK TOOL and GAGE CO. LINCOLN PARK, MICHIGAN



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CARBLOX ARE SUPPLIED IN THE

FOLLOWING BUILD-UP RANGES

Carblox are furnished to "A" accuracy (.000004") and "B" accuracy (.000008") as a series of wear blocks to be used on the ends of a gage block build-up or as individual blocks when a build-up is not required.

The fourteen block set consists of two .050°, two 1.00" and one each of .05005", .0501", .0502", .0503", .0504", .0505", .0506", .0507", .0508", and .0509". The .050" and .100" blocks are also furnished in boxes in pairs as well as in combination—that is two .050" blocks and two .100" blocks in a box.

The full build-up range of the standard 81-piece set of gage blocks is available when Carblox are used. For example in a .4051" build-up, one .050" Carblox and one .0501" Carblox would be used with one ordinary .200" and one ordinary .105" gage block. The half-tenth (.05005") Carblox further supplements regular gage block sets.

Washington . . . L. W. MOFFETT

 Congressional bloc seen determined to check War Department's V-loan revisions
 ... Accent on contract terminations not held to mean lowered war production.



WASHINGTON—However wellintentioned and desirable may be the War Department sponsored revision of the Federal Reserve Bank's Regulation "V" dealing with contract termination loans, it might prove to be a monument to a short memory.

In the last Congress, legislators made it clear that they were starting a campaign to return to Capitol Hill the prerogatives so long usurped by the executive agencies on questions of major governmental policy. A poll of members interested in the problems of war contract termination reveals that there is a sizeable bloc determined to check the War Department's latest move.

The revised regulation permits the guaranteeing of loans up to 90 per cent of the termination charges due the contractor from the government. As soon as a contractor receives notice of termination, the financial institution with which he desires to negotiate a loan is informed by the contracting agency of the termination.

The bank is to agree to make a loan upon termination of the contract in exchange for the contractor's promise to pay the loan through assignment of the right to receive termination charges due from the government. The contracting agency then agrees to guarantee payment of the loan.

The reason Congress may quickly assert itself is that the War Department, which requested approval of HR 3022, has gone ahead and put the bill's provisions into effect without

waiting for that approval. While representatives and senators favor financial help to business in its gradual demobilization and do not condemn all of the War Department bill, they want to incorporate the provisions they think important.

A spokesman for the War Department said that the Department has no concern with making rules for the post-war contract termination, but is only interested in getting some regulations into effect to take care of wartime problems.

Regulation "V" was originally set up last May to finance war production pursuant to an executive order issued under the provisions of the Second War Powers Act. "V's" revision to provide for the financing of contract termination is of debatable legality in the opinion of legislative experts.

Also, there is questioning of the lawfulness of obligating government funds primarily designated for guaranteeing loans for financing of war production to the secondary purpose of guaranteeing loans in connection with confract termination.

To be legal under the executive order as it now stands, it is pointed out, loans would have to be negotiated in the period between notice of termination and the actual termination date. Contract experts declare if such a policy were pursued it would be impossible to determine what termination charges should be because of the work which would be in process between the two dates.

A contract protected by one of the new guarantees when it is terminated entitles the contractor to draw from the bank that portion of the loan termination commitment to which he is entitled under the contract.

The interest accrues between the time termination charges are fixed and the date the loan is to be paid by the contracting agency. The War Department points out that it is unfair to charge the contractor with interest while he is waiting for the government to make settlement. Contractors must settle with banks within 10 days after the government pays termination charges.

Contractors may now claim sums falling under the following costs under terminated contracts:

All articles complete, delivered and accepted by the government according to the unit price specified in the con-



SAFE AT HOME: This is the kind of punishment a Flying Fortress catake and still bring the boys home. Badly hit over Germany, this plan caught fire, creating these gapin holes but brought its crew safel home.

tract; partly completed articles; worked and unprocessed material any other reasonable expense indental to termination.

If agreement cannot be reached on the value of work in process, the amount due the contractor is fixed in one of two ways. He is either given a percentage of the contract price equal to the percentage of the work in process completed, or he is given the actual cost of the work performed plus a profit of not less than 1½ per cent, nor more than 6 per cent of the cost of the work. Cost is determined in accordance with the joint Army-Navy principles for the determination of costs.

THE Army has already terminated more than 5000 contracts. Navy's cancellations affect 1500 in addition. The value of contracts so affected is said to be nearly \$4,000,000,000. There are 250,000 prime contractors, with subcontracts running into the millions.

Thus it can be seen that government attempts to cushion the manufacturer's financial shock of getting out of the war business are mandatory

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SUNICUT

performed triples tool life . . . improves finish . . . increases production"

Tool "absentees" can hurt war production just as much as the operator who stays away from his job. One large plant faced with the problem solved it this way.

Every 4 hours time was lost in changing tools . . . regrinding caused production to lag. They called in a Sun Cutting Oil Engineer who studied the problem and recterminated ommended a change in cutting oil — to Sunicut 110. cts. Navy's

Here are the results. Instead of time out for changing tools every 4 hours they now change them only every affected is 12 hours — a 200% increase in tool life! Sunicut's transthe mil parency permits easy inspection of work while machin-

. and a smoother finish is obtained. Because of less "time out" for tool changes production increased 20% . . . and is being stepped up still more since machine speeds have now been increased one-third.

Performance like this is winning Sunicut an outstanding reputation on all operations where a straight, sulphurized cutting oil is used. For longer tool life, better finish, increased production in your plant, call on a Sun Doctor of Industry to analyze your needs and recommend the proper grade of Sunicut today. Write

SUN OIL COMPANY · Philadelphia Sun Oil Company, Ltd., Toronto and Montreal, Canada

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if war production is to be maintained at high levels during the war, and if industry is to be financially able to reconvert to peacetime production. Whether the tune is set by Congress or by the War Department is irrelevant to business so long as equally advantageous deals are obtainable from both. This may be an unfortunate situation from the viewpoint of the constitutional purist. Since May of last year, Federal Reserve figures show that the government had guaranteed over \$4,000,000,000 in "V" loans. In addition, there were more than \$2,200,000,000 available to borrowers under guarantee agreements outstanding on June 30.

It is argued with some force that if it were necessary for the government to provide so much assistance to contractors to get into war production, the government should likewise be called upon to help business firms shore up their financial structures which have been thrown out of kilter by the war.

The amount of loans which a contractor will be entitled to obtain when his contract is canceled will be stated in the loan agreement as a percentage of inventories, work in process, accounts receivable, and without duplication, amounts paid or concurrently

payable by him to subcontractors or suppliers by reason of cancellation.

OAN agreements under the new program will include provision for such amounts of working capital to carry out war production contracts as may be needed by the contractor in the particular case. In general, the amount of credit needed to carry out the war production contracts is small in proportion to the amounts needed to free working capital upon contract terminations.

The accent on termination should not be considered as an indication that there is contemplated a general curtailment of war production. The War Department says that the contrary is true, that present curtailments are caused by shifting of battle demands and that new Allied undertakings will require more and more war goods.

Henry Ford's Iron Ore Mine Gets Price Boost

Washington

• • • • OPA has granted the application of the North Range Mining Co. by issuing Amendment 35 to Revised Supplementary Regulation 11, exempting the service of mining iron ore from the regulation. Effective June 24, OPA granted exemption to this company on and after that date. The amendment extends the exemption retroactively to all services since July 1, 1942. In the statement of consideration, issued in connection with the decision, Chester Bowles, Acting Administrator, said:

The North Range Mining Co. extracts iron ore from the Blueberry Mine, owned by the Ford Motor Co., pursuant to a contract which provides that the fees for such service shall vary in accordance with labor costs. The ore mined belongs to the Ford Motor Co. and is used in its own operations. Careful investigation has disclosed no other similar arrangement.

As a result of an increase in basic wage rates in the mining industry in July, 1942, and the commencement of operations on a six-day basis in November, 1942, costs of operating the Blueberry Mine have risen substantially. North Range has shown that because the provision of its contract were rendered inoperative by the General Maximum Price Regulation it has suffered a loss on the operation of the mine which its overall financial position does not permit it to absorb.

As set forth in the statement of considerations involved in the issuance of Amendment 24, ore from captive mines was excluded from Maximum Price Regulation No. 113 and owners of such properties absorb all mining costs. Since the arrangement between North Range Mining Co. and Ford Motor Co. closely resembles a captive mine situation, it is proper that it be given the same treatment.

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Pliers Production Broadened

Washington

• • • Manufacture of certain types of wrenches, pliers and nippers for the ultimate consumer, which previously was prohibited, is permitted through amendments to Schedules II and III of Limitation Order L-216, the WPB announced. Prohibition on manufacture for a producer's inventory or for a distributor's inventory or shelf stock is continued.

The amendments will serve to reduce paper work for the tool industry and WPB on appeals for special tool specifications, the Tools Division of WPB said. Amendment to Schedules II and III to Limitation Order L-216 was issued Sept. 3.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



The bird that is its own mother!

THE FABLED PHOENIX lives for 500 years. At the end of that time, it builds itself a nest in the branches of an oak or the top of a palm tree. After the funeral pyre is complete with cinnamon, spikenard and myrrh, the phoenix sets the nest on fire and burns itself alive.

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chedules er L-216 From its body, or its ashes, a young phoenix issues forth, destined to live another 500 years. When it is strong enough, it carries the nest—its own cradle and its parent's coffin—to the temple of the Sun.

We think the modern parallel to this story is even more interesting, because it's true! Did you know that machine tools are the mothers of machines? They are the only things made by man that can reproduce themselves. And it's fortunate for us they can, because

machine tools are a measure of the degree of civilization of a country.

Machine tools are the foundation of all modern industrial production. They are not only essential for the manufacture of every class of engine and kind of mechanism, but every manufactured product—metal goods, textiles, foodstuffs, scientific instruments, building materials—all must be built on machine tools or on a machine constructed with their help!

In the post-war era, Cone Multiple Spindle Automatic Lathes will be even more essential than they are now. Their unique advantages of departmentalized control will be available to industry to help bring us all better living than we have ever known before.

ONE Automatic Machine Company, Inc., Windsor, Vermont

WEST COAST ... OSECOD MURDOCK

Global projection centered upon West Coast fascinates this column writer, who speculates upon future commercial possibilities...
 Hawaii, Dutch Harbor, Nome and New York all are equidistant.



San Francisco—"My purpose is to sail beyond the sunset" declared Olysseus as reported by Wordsworth. Presumably thereupon he sailed west.

If the adventurer of the future, be he political, economic or military in his objective, sets sail from the West Coast of America to fare forth far enough beyond the sunset on the broad Pacific, whether by sea or air, he had better first examine a modern global map and then sail north, as we see so vividly demonstrated in this adjoining column.

Global geography has become popular to the point of profusion. The far sighted, space annihilating aircraft people have extensively sec-

onded the original motion of the geopoliticians and the *Time-Life-Fortune* crowd.

Catching the contagious virus and applying it to the particular position of the West Coast of the United States, Dr. Joseph E. Williams of the local Junior College has worked out a San Francisco centered azimuthal equidistant projection to indicate true radial distances and direction as measured from the West Coast. So unconventional is the resulting chart and so vivid is its demonstration of future airline relationships that it warrants reproduction and wider attention and study.

It is to be noted on a chart of this

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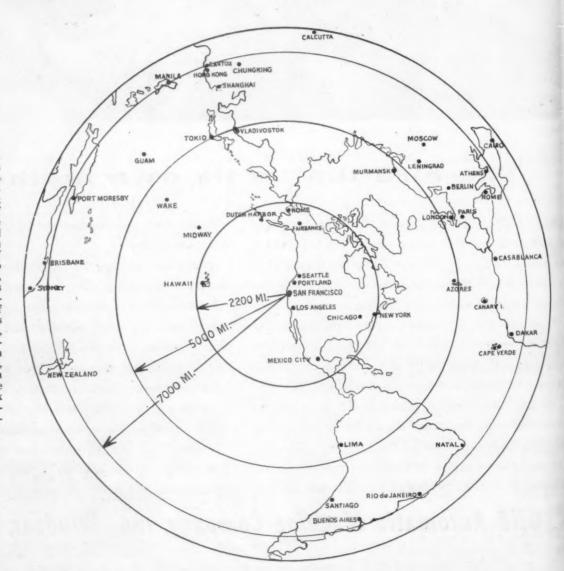
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GLOBAL LOBAL PRO-JECTION: This San Francisco centered azimuthal equidistant projection of one side of the globe, developed by Dr. Joseph by Dr. Joseph. E. Williams of San Francisco Junior College, demonstrates the future relationship of world airlines and, possibly, inter-continental trade. From San Francisco. Hawaii, Dutch Harbor, Nome and New York approxiare mately equidistant.







NUMBER ONE: Employees of the Kaiser Co.'s new steel plant in California watch the first ingot being rolled into steel plate on a 110-in. tandem plate mill built by the Lewis Foundry & Machine Division of the Blaw-

sort that any straight line from the azimuthal center indicates the shortest distance to any point and furthermore that all radial distances are true and correct. On the other hand, it must also be clearly understood that distances along concentric circles, particularly as they become nearer the outside perimeter, are greatly exaggerated. The indicated distance from Casablanca to Dakar, for instance, is anything but true in relation to the distance from Moscow to Murmansk, and the distance from Calcutta to Cario is not what it seems. But, on the other hand, the distance from San Francisco to Vladivostok is almost identical with the distance from San Francisco to the Azores and is only a little further than to Lima. Peru. Any ruler can scale radial distances correctly.

N an additional respect the draftsman of this global map has improved upon what could be achieved by simply holding a globe in front of a camera and taking a two dimensional picture. The hemisphere in its relation to San Francisco as a pole will pass through Shanghai and the Solomon and Cape Verde Islands and Rome. But we continue 20 degrees beyond, on the same scale.

For those who have not properly

realized or contemplated great western distances or relationships, the chart should be significant. For instance, from San Francisco, Hawaii, Dutch Harbor, Nome and New York are all equidistant, approximately 2200 miles.

To the military strategist a study of the Pacific area with respect to the West Coast of the United States has long and vividly emphasized the importance of Alaska and the Aleu-

tians. Project an absolutely straight line from San Francisco to Tokyo, and Dutch Harbor is only a few miles off the path. Continue it southward and the line practically traverses the Panama Canal, From this point of view, it is vividly apparent that the West Coast of South America, West Coast of North America and the East Coast of Asia practically lie on a continuous global line. "North to the Orient" is literally true from the Pacific Coast.

Considered in the light of post war commerce, doesn't it seem probable that the trend should be toward land planes and possibly highway or railway travel, rather than by the trans-Pacific liners or Pan American Clippers that up to now have hopped from Hawaii, to Midway, to Wake, to Guam, to Manila, to Canton. Except for the few miles across Bering Straights, the shortest distance is overland, and by the time the military road to Tokyo has been hewed and blazed, there will likely be airports if not a highway most of the way.

As the Yankee shipmasters from New England pioneered in the long passage around the Horn and across the vast Pacific early in the 19th century, and as they were followed by the missionaries, the trans-Pacific steamers, the Pan-American clippers and finally the determined and vengeful American Navy, so post war commercial interests on the Pacific Coast look forward to a new era and a great development bordering the Pacific. In planning the era and in paving the paths of peace that shall follow the wavering ways of war, this global airline chart may be of inestimable help.



... Cited for Awards ...

• • • The following companies have been awarded the Army-Navy "E" for outstanding performance in production.

Link-Belt Co., Pershing Road plant, Chicago.
Belle City Malleable Iron Co., Racine, Wis.
Cape Ann Tool Co., Pigeon Cove, Mass.
Cayasler Mfg. Corp., Buffalo.
Chicago Wheel & Mfg. Co., Chicago.
Criterion Machine Works, Beverly Hills, Cal.
Crown Fastener Corp., Warren, R. I.
R. J. Ederer Co., Chicago.
Electrical Connectors & Mfg. Co., South Milwaukee. Wis.

waukee, Wis. General Motors Corp., Aeroproducts Division,

Plants No. 1 & 2, Vandalia, Ohio, and Delco Appliance Division, Rochester, N. Y. Haber Screw Machine Products Co., Chicaga Hamilton Mfg. Co., Two Rivers, Wis. Hathaway Mfg. Co., New Bedford, Mass. Heller Brothers Co., Ohio Plant, Newcomerstown, Ohio.

lico Ordnance Corp., Dickinson Mill, Bedford, Ind.

ford, Ind. National Enameling & Stamping Co., Mil-

waukee, Wis.

Remington Arms Co., Inc., Utah Ordnance
Plant, Salt Lake City, Utah,
G. F. Richter Mfg. Co., Inc., Glendale, N. Y.
Strong, Cobb & Co., Inc., Cleveland.

Tulsa Winch Mfg. Co., Tulsa Plant, Tulsa,
Oklo

84-THE IRON AGE, September 9, 1943

TURNING UP PRODUCTION SCHEDULES WITH INDUSTRY'S NEW RIGHT HAND

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Mill, Bed-Co., Mil-Ordnanes Iale, N. Y. I. ant, 'Tulsa, Production - line Efficiency in a Single Piece of Equipment!

Indexing tables put wings on many production operations—as effectively as the revolving pistol barrel put wings on trigger fingers!

And wherever quick, accurate indexing can help production, HydrOILic equipment offers distinct advantages. HydrOILic indexing presses show why. Their hydraulically operated tables position the work with higher precision. Rapid, continuous operation is achieved by merely feeding and emptying the table. Safely too, because hands are never near the ram.

"Start and stop" shocks of indexing tables are overcome, because oil is the medium through which they are propelled. Oil (and the speed of the tables) can be regulated instantly without wear or strain, and with absolute accuracy. That's why HydrOILic equipment has proved so effective in speeding up such wartime jobs as shell loading and crimping, powder compressing . . . as well as many pressing, pushing and lifting operations.

Why not get together with Denison

HydrOlLic engineers on your problems or ideas? Write. The

Denison Engineering Co.,

1158 Dublin Rd.,

Columbus, Ohio

DENISON EQUIPMENT IN APPLIED

Fatigue Cracks . . . BY A. H. DIX

Present for Uncle Hubert

• • • The inhabitant of the next cubbyhole to ours, Frank J. Oliver, our technical editor, says that the other day he was talking to an engineer who thought it would be nice if all technical articles could be boiled down, without loss, to a page or two. We agree. But the engineer went further. He said it could be done.

This is not so. An article, like a liverwurst skin, must be long enough to cover the subject. Sometimes a half column is enough; other times eight pages, and

sometimes a book.

The generalization that anything can be re-written to half its original length, with no loss, is, like all generalizations, true only occasionally. It all depends on who did the original writing. Sometimes a two-paragraph item is one paragraph too long, owing to loose writing. Other times a ten-page article will be found to be so economically written that not a line can be cut without causing it to "bleed."

All of us have sluggish spells when the amount of reading that has to be done to keep up with the parade appalls us. We long for royal roads, and if we fall far behind, mental grawings express themselves in the shape of criticism of information dispensers for not

doing a more thorough winnowing job.

Synopses and abstracts are seldom nourishing and never appetizing, as we found out years ago when we got, with a Collier's subscription, a set of books in which the world's wisdom was boiled down to 12 volumes. The abstractors managed to ruin everything they touched. As we recall it Confucius got four pages. The whole thing was as tasteless as a Spanish omelet made from powdered eggs. So we gave it to our Uncle Hubert. It can't hurt him as he gets all he wants to know from Gabriel Heatter.

Aptronym

••• A new member of the Detroit Board of Commerce, we see by a list Stan ("Assembly Line") Brams just sent us, is F. J. Watts of the Watts Electric &

Mfg. Co., Birmingham, Mich.

This is one of the more obvious aptronymic types. More to our liking is the name next to Mr. Watts'—Lew Wisper, of Wisper & Wetsman Theatres, Detroit. It makes us think of the story about the young actor who was criticized for not speaking his lines clearly, and who mumbled, "A boy's best friend is his mutter."

Correction

• • The nation's biggest magazine, measured by advertising volume, is not the Ladies' Home Journal, nor Life, nor the Saturday Evening Post—nor any of the journals which run up to 3 or 4 million circulation. The champion is Iron Age. It carried 6,640 pages of advertising last year, and mails out 17,000 copies each week.

— Wall Street Journal.

Thanks for the plug, but it's 19,000.

Deac Downed in Stampede

 • • • Speaking of slow-dialed and fast-dialed telephone numbers, this is a particularly serious matter to newspapers. On a paper I used to work for, an edge of 10 seconds was a beat entitling you to a gold star on the bulletin board.

More than once I was knocked on the back of my neck by the opposition in rushing to the telephones to report

an important event.

Among the New York newspapers, the World-Telegram has the fastest number, BA 7-3211. The News is next with MU 2-1234, and a hair's breadth in back of it is the Sun with WO 2-2323. But the country's greatest newspaper, the Times, manages to survive the handicap of three time-killing zeroes—LA 4-1000. So does the Herald-Tribune, with PE 6-4000. Slowest number of all is the Post's, whose leg men get flatfooted dialing WH 4-90000.

Dozens of Kohinoors, Weekly

• • • That eyes are on the newest member of your favorite family journal's editorial team, the News Front page, is evidenced by the rising volume of applause from loving readers. We have withheld publication of the verbal handclaps, not through modesty but because we have been waiting for one of the customers to make the \$64 observation. H. O. Bates of the Acromark Co., Elizabeth 4, N. J., does so:

We enjoy the new addition, "News Front," in which you frequently give information we have been unable to ob-

tain from any other source.

The reason so much of the information in *News Front* is unobtainable from any other source is because it has never appeared anywhere else. In other words, it is the result of a prodigious amount of original spadework. The news diamonds dug up frequently beat general publication by two or three weeks, oftentimes as much as a month.

Although we say it as shouldn't, if you read News Front regularly your friends will think that either you have a pipe line to quarters where news is brewed or

that you are psychic.

Grocery Notes

• • • We learned two new things recently that we would like to pass along to you. A recent News Front informed us that rats can't regurgitate, and "The Way," a house magazine issued by the Agerstrand Corp., Muskegon, Mich., tells us that "Man is the only creature that cooks his food."

The fact that both these items have an alimentary connotation is purely coincidental. We don't know what use you can make of them, but they may be handy bits to pop out at the dinner table when conversation lags.

Exit Rhyming

• • • We like to keep you in touch with the latest epistolary uses of ...—, the V for Victory symbol. A Midwestern firm starts its letters with "Dear Mr. Jones ...—," while one in California takes the trouble to write the three dots and a dash in red ink under the V in "Very truly yours." Probably the most painful use of the coded V is by an International Harvester man, who ends his letters "...— very truly yours."

Interstate Aircraft & Engineering Corp., DeKalb, Ill., bows out with a little rhyme, "Yours for V in '43." As this is rapidly losing weight, Interstate's committee on sign-offs is probably looking for a successor. We

offer "War, o'er, '44."

Scrambled Signature

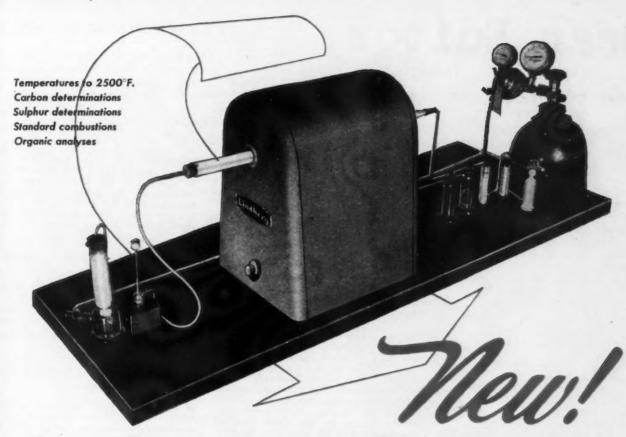
• • • Fred Binkley, of Reynolds Alloys Co., Listerhill, Ala., submits this signatorial super-duper.

Here we have an unusual combination of the extra condensed and shoot-the-works type of writing, indicating that the signer, O. J. Underwood, manager of the Southern Cotton Oil Co., is a man of complex personality.

Puzzle

Fifteen minutes is par for this:

A double-track trolley line runs between two stations which are 6 miles apart. From each station cars set out for the other station every 7½ minutes and proceed at uniform speed. A pedestrian leaves one station just as one car is arriving and another leaving. He walks beside the right-of-way at constant speed until he reaches the other station just as one car is arriving and another leaving. Including these 4, he saw 62 cars on his way, 19 going in same direction and 43 in the opposite direction. What was his speed, and what was the speed of the cars?



Combustion Tube Furnace

Lindberg presents a NEW, precision controlled Combustion Tube Furnace with temperatures up to 2500°F. in use for the new, 2 minute volumetric method of carbon and sulphur determinations, standard combustion, organic analyses, etc. The high temperature range is equally applicable and desirable for gravimetric carbon and sulphur determinations, especially on high alloy steel.

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LINDBERG

Well-known Throughout the World as the Leaders in Developing and Manufacturing Industrial Furnaces



LINDBERG ENGINEERING COMPANY
2450 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

This sturdy unit is constructed of courses of high temperature fire brick and insulating slabs encased in a heavy sheet steel shell. All wiring and terminal connections are fully covered and are easily accessible for maintenance.

The furnace shown above has a heating chamber 13%" diameter by 12" long. Low voltage, high temperature type Globar elements are employed for maximum temperatures of 2500°F. and the heat is regulated by a built-in, variable voltage transformer with a power input of 1500 watts. These furnaces are complete with indicating pyrometers.

Like all other Lindberg Laboratory Furnaces, the clean streamlined shape of the Combustion Tube Furnace contributes to the high standard of laboratory cleanliness.

Write or phone your regular laboratory equipment dealer for further information. He will be glad to serve you.

SOLD EXCLUSIVELY THROUGH LABORATORY EQUIPMENT

Dear Editor:

COAST C. I. PIPE COST LOW

On page 94 of your July 8 issue is a discussion on the cast iron pipe industry in the post war period. Cast iron pipe can be made at the furnace of the Fontana plant at a lower cost than at Birmingham, Ala., by using a permanent hot mold centrifugal process, the pipe from which does not require annealing, and hot metal from the blast furnace treated in a heated mixing ladle. The metal cost and freight rates are:

> Fontana, Cal. Hot Metal

Pig iron price \$24,00 gross ton 21.60 net ton

> Birmingham, Ala. Cupola Metal

Pig iron price		
** ** **	18.38	net ton
Cupola melting cost	2.50	86 86
Cupola melting loss - !		
per cent	1.37	** - **
Hot metal cost	\$22.25	44 44

Freight from Birmingham to the Pacific

Rail	to A	Iobile						. \$	3.60
Boat	fron	n Mobi	le t	o F	acif	ie (oas	t	6.40
								-	

Pacific Coast Rates

Fontan	a	to	Coas	t.	* *	 	. *	*				\$1.00
Pacific	Co	as	twise	cos	sts							4.50
												-

As will be seen from the foregoing, in the case of Fontana pipe there is a saving of \$4.50 a ton on Pacific Coastwise shipments. Moreover, as 40 per cent of the pipe is used in Southern California and Arizona, the Coastwise shipping cost is saved and the only freight cost involved is that from Fontana to the point of use.

Pipe can be cast for \$10 over the cost of melted iron, or \$21.60 plus \$10, \$31.60 furnace. At the base of \$56 a ton, there would be quite a profit.

Edgewater Park, N. J.

WETABILITY

Have you books on the wetability of molten metals or surface tension?

We are interested in those characteristics of copper, babbitt, cadmium, lead and silver.

WARREN W. WALKER, General Manager

Graphite Metallizing Corp., Yonkers 3, N. Y.

• We have no data. You might obtain it vve nave no data. Tou might obtain it from the American Physical Society of New York, Carl Darrow, Secretary, in care of Columbia University, New York City, which we believe has published some information on the subject.—Ed.

FIRST FERROMANGANESE

Where was ferromanganese first used in connection with the manufacture of steel in the United States? We also would appreciate it if you could tell me when the first basic open hearth steel was made in the United

> C. H. NEWCOMB, Vice-President

Rogers Brown-Lavino Co., \$528 Walnut Street, Philadelphia

• The first acid Bessemer steel was made in a Kelly converter at the Cambria Iron Works in 1861, although experimental runs were made a year or so earlier.

Ferromanganese or spiegeleisen, devised by the Englishman Mushet, was first used in the U. S. for steel making about 1857-1861. The Kelly, Bessemer and Mushet processes were tied in together. Kelly could not achieve success without Bessemer's machinery, and Bessemer could not make steel without Mushet's ferromanganese. To simplify the complex situation, all the patents were thrown together in 1866. Basic steel was first produced in this country by the Penn-sylvania Steel Co., Steelton, Pa., May 24, 1884. Basic open hearth steel was first made in this country at the Homestead Works of Carnegie, Phipps & Co., Ltd., March 28, 1888.—Ed.

GOVERNMENT JOB

\$10.00

For several years I have read with a great deal of interest your weekly editorials in THE IRON AGE.

I find myself heartily in agreement with your viewpoints with very few exceptions, but have never heretofore felt inclined to write you.

However, your Aug. 19 editorial, "Want a Government Job After the War," seems to me to be so timely and so forcefully to the point that I am writing to tell you I would like to have about 250 copies.

G. L. CANFIELD

Basca Mfg. Co., Inc., 3001-3101 Roosevelt Avenue, Indianapolis, Ind.

We were particularly interested in your Aug. 19 editorial, "Want a Government Job After the War." Could the writer get 75 to 100 copies to distribute among members of a local civic organization?

We enjoy the new addition to THE IRON AGE, News Front, in which you frequently give information we have been unable to obtain from any other

H. O. BATES

Acromark Co. 9-13 Morrell Street. Elizabeth 4, N. J.

ELECTROPLATING NON-METALS

Your Aug. 12 News Front mentions plating of non-conducting materials. Can you tell me how I may find out more about this process?

L. H. CONRAD, Process De

Delco-Remy Div., General Motors Corp., Anderson, Ind.

• The item in "News Front" referred specifically to a process developed by the Pre-cision Paper Tube Co., 2023 W. Charleston St., Chicago 47, with which we suggest you communicate. For detailed information on how to plate metals on non-metals, see the two-part article appearing under that in the issues of June 12 and 19, 1941.-Ed.

SEAMLESS TUBING GUN TUBES

In a recent issue you carried an interesting article on the manufacture of gun tubes by a seamless tube process. We would be very much interested in reading this in connection

P. F. McLAMB,
Lt. Col., Ord. Dept.,
Asst. Prof. of Ordnance
West Point, N. Y.

See "H-

 See "Heavy Gun Tubes from Seamless
Tubing," August 12 issue, pages 74 to 79, Tubing," August 12 issue, pages 74 to 79, describing Timken's new methods. Copies are being mailed to you.—Ed.

SHIP SABOTEUR

We would appreciate it very much if you would send us a clipping of the July 8 editorial, "Saboteur Bombs 50 Liberty Ships."

JANE ULREY

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Engineering Library, Westinghouse Elec. & Mfg. Co., Bloomfield, N. J.

NE STEEL CHART

Sir:

How can we obtain THE IRON AG NE Steel Standard Steel Chart, See tion 1? We have Section 2 of this chart and are interested in obtaining Section 1.

ULRIC R. JAEGER, Materials Enginee

Carl L. Norden, Inc., 80 Lafayette St., New York

• There is no Section I of the chart. The chart appeared as a supplement to or May 6 issue. To conform with postal regulations, it was marked "Section 2." Section I was the May 6 issue itself.—Ed.

FORGINGS

Where may we obtain magazine pamphlets, or other technical information tion on forgings?

THOR HENRIKSON Chief Engineer, Tank Division

Pacific Car and Foundry Co., Renton, Wash.

• This and other technical journals cal articles from time to time on particular phases of forging developments. The beal-round work on the subject is the Faring Handbook, by Naujoks and Fabel, pulshed by American Society for Metals, 70 Euclid Ave., Cleveland .- Ed.

SAVES 5240 PER TON (60%)
on Cleaning Costs

BY AIRLESS WHEELABRATING

MODERNIZATION of the cleaning department at New York Air Brake Co., Watertown, N. Y.—which included the installation of two Wheelabrator Tumblasts and a

Special Wheelabrator Cabinet—resulted in cost savings of over 60%.

In 1937 a careful analysis of its cost of cleaning medium sized, ten to seventy pound, railroad castings was made by this company. Compressed air sand blast barrels were then used but this process was not only slow and inefficient, but many castings had to be spot-blasted to obtain perfect cleaning.

Cleaning costs, including cost of labor, power, air supply and maintenance, were found to be \$3.96 per ton of castings cleaned. Realizing that this figure was excessive, a 36" x 42" Wheelabrator Tumblast was installed. Cleaning costs per ton of Wheelabrated castings then dropped to \$1.56, representing a saving of \$2.40 per ton.

Three Wheelabrators Installed

With wartime demands bringing greatly increased production, a 48" x 48" Wheelabrator Tumblast and a Wheelabrator Special Cabinet were installed in early 1942.

The latter machine was installed primarily to clean air reservoir castings. These castings, weighing 120 pounds, were first cleaned in a sand blast room. Later, they were cleaned in Tumbling mills, with small logs packed with them in the mills to reduce breakage.

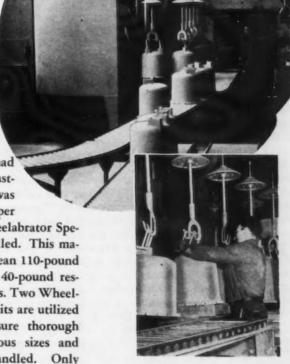
Cost of cleaning air reservoir castings

in tumbling mills had been 17.1 cents per casting, but this cost was halved, to 8.4 cents per casting, when the Wheelabrator Special Cabinet was installed. This machine is also used to clean 110-pound cylinder castings, and 40-pound reservoir partition castings. Two Wheelabrator airless blast units are utilized in the cabinet to assure thorough cleaning of the various sizes and shapes of castings handled. Only one man is needed to operate the machine.

\$8,298.74 Savings in 5 Months

An analysis of cleaning costs during the first five months the three machines were in operation revealed a saving of \$8,298.74 over the costs that would have prevailed for cleaning the same quantity of castings under old methods!

Because the Wheelabrator removes sand and scale right down to the virgin metal—which was impossible with the former air blast and tumbling methods — much longer tool life in the machine division has resulted and castings are cheaper to machine.



American

FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST. . MISHAWAKA, IND.

World's Largest Builders of Airless Blast Equipment

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This Industrial Week . . .

- · War Output Gains Are Real Achievement
- Critical Manpower Crisis Gets Attention
- · Buyers Scurry to Get on Steel Mill Books
- National Ingot Production Rises One Point

AR production gains at a time like the present, when the manpower situation probably is the most unsatisfactory that industry ever has experienced, dwarf all past achievements of the nation's mines, mills and factories. The No. 1 industrial problem has been growing more critical steadily, with the rise in common labor turnover unabated despite various governmental rulings and red tape.

Yet production of aircraft has jumped upward again and output of other armament appears stronger than ever after proper adjustment. National steel ingot production has reached 100.5 per cent of capacity for the first time since October, 1942, an increase of one point over last week.

Putting other matters temporarily into the background, Washington concentrated on the manpower dilemma last week at the risk of reopening strife between agencies jealous of their powers. The government's new action placing the West Coast under strict labor priorities seems to leave some questions unsettled, principally involving the attitude of labor, which probably will oppose extension of the plan. WPB now has the right to say what plants are the most important in a certain area, for purposes of establishing manpower priorities. Whether further friction will arise depends on the exact wording of the order issued by James Byrnes.

Any plan adopted to help solve the critical manpower shortage can be expected to grow less flexible as the labor supply grows tighter.

M EANWHILE, in the steel industry last week, the scurry by customers to place orders on mill books was intense in some areas and in regard to certain products. Even specifications for steel to be delivered one year from now were lodged with producers. Reminiscent of the pre-CMP era, the rush by consumers seemed partly caused by numerous instances recently where buyers were unable to place late allotments with booked-up mills. (Coinci-

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dentally, WPB last week warned that contractors placing orders for more material than authorized will be dealt with sternly.)

Another contributing reason is believed to be the very tight production situation facing plate mills, confronted with increased fourth quarter orders from shipbuilders. Heightened activity of this kind

Machine Tool Builders vs. Renegotiation

Cleveland

• • A plea for recognition of the special problems of the machine tool and other comparable industries as manufacturers of items that will be used in the war only temporarily and will thus saturate the post-war market for the remaining years of their existence is contained in a pamphlet just issued by the National Machine Tool Builders Association, entitled "Renegotiation." The crux of the inability of the builders to agree with the findings of the price adjustment boards is that the industry would like to retain enough money to finance research and development for post-war markets and to pay workers during the development period. It is the amount of profits to be returned rather than the principle involved that is the basis of present disagreements. The machine tool builders have been unduly hit also by the excess profits tax which is based on average earnings for the years 1936 through 1939, since growth of industry sales has been so enormous since 1939. In summarizing its position, the Association pleads for recognition of the principle that only earnings after taxes, rather than before taxes, should be reviewed; also for recognition of the need to exempt from renegotiation that part of the life of a machine which is not expected to be expended in the war and which will thus be engaged on peacetime work.

in plates is bound to be reflected in other departments. Railroad carbuilders have been ordering plates freely but some mills despair of being able to ship as desired unless cancellations from ship-builders provide the necessary openings on mill schedules, which has been the principal method of serving carbuilders recently. Plates are now under closer control by the WPB. All plate mill schedules for the fourth quarter have been frozen for the first time. Any cancellations or holes in these schedules must be plugged up by the WPB alone. In a few months after new mills hit their strides, the tightness surrounding plates may disappear rapidly, like the about-face now admitted by WPB in the market for electric furnace alloy steel.

W ITH open-hearth capacity growing faster than the completion of finishing facilities, the interchange of about 30,000 tons per month of steelingots will be necessary between steel companies. Before the war there was no ready market for ingots and the price of \$31 per gross ton f.o.b. mills was not set in anticipation of heavy sales. In order to

help smooth matters for steel executives who have been worried over who will foot the bill for the interchange of material, the WPB Steel Division has announced that the aid of the Metals Reserve Corp. will be sought. This has not entirely reassured the industry, however, for it is pointed out that there is yet no indication as to just how far MRC will go with its assistance.

The forthcoming decision of OPA on higher Lake Superior iron ore prices is being awaited with great interest. Ore mining companies are expected to be given an increase retroactive for the 1943 shipping season, but not to the extent they desire. When the decision of OPA is announced, pig iron producers may ask for an upward adjustment in their selling prices, perhaps to be followed at a later date by similar requests from steelmakers.

O PTIMISTIC for months over scrap supplies, steel companies now are stepping up their acquisitions and have indicated to the government their willingness to enlarge their inventories, which is interpreted by Washington as welcoming the proposed national scrap drive Oct. 1-Nov. 15, a campaign that is expected to be shaped toward averting some of last year's mistakes. The drive will be much more difficult than last year's undertaking. The goal for collections in the latter half of this year is 15,000,000 net tons of scrap, with 60 per cent of it to be heavy industrial scrap.

The drive will have for its keynote "insurance," instead of "emergency," which keynoted the previous campaign.

WPB's latest distribution plan is CAP, or Coordinated Authorization Procedure, designed to eliminate hundreds of applications for critical noncontrolled materials by permitting a manufacturer

Superior Ore Shipments Set Records

Cleveland

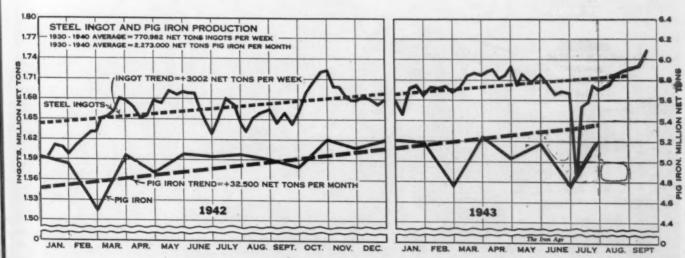
• • Shipments of Lake Superior ore during August reached an all-time peak, when 13,909,891 gross tons were shipped to American ports and 66,879 tons were delivered to Canadian ports, a total of 13,976,770 tons. Total shipments during July were 13,588,814 tons. The total downlake ore movement this season is more than 8,000,000 tons below shipments to Sept. 1, 1942. To date this year, 52,359,474 tons have been shipped to consuming ports, whereas to Sept. 1, 1942, shipments amounted to 60,593,534 tons. In order to attain the 1943 season goal of 86,500,000 tons, shipments in September, October, and November will have to average 11,400,000 tons per month.

to make one application for such items. The plan is still in the consideration stages, however. The size of the paper dam CAP is supposed to dynamite is 75,000 pieces which flow in and out of WPB weekly.

The pig iron supply throughout the country is generally very comfortable. Iron is moving into needed spots in substantial quantities and pretty much as needed. The tightest situation occurs on low phos iron, mainly because of British demand.

PITTSBURGH steel ingot operations have gained a point to 102.5 per cent and Youngstown output has been increased one and a half points to 97.5 per cent. Steelmaking in Wheeling has reached 100 per cent, half a point higher than last week. Cincinnati is again operating at 105 per cent. Down half a point to 99 per cent is output in Chicago, while Cleveland operations have fallen two points to 98 per cent. Detroit has sagged half a point to 103 per cent.

The Oron Age_



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohie River	St. Louis	East	Aggregate
September 2	101.5	99.5	96.0	93.5	100.0	104.5	99.5	98.5	103.5	102.0	103.0	86.5	99.5	99.5
	102.5	99.0	97.5	93.5	98.0	104.5	100.0	102.0	103.0	102.0	105.0	86.5	97.5	100.5

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PORTER 5186699 LOCOMOTIVES

The PORTER FIRELESS carries no firebox—charge it with steam from your
plant powerhouse once or twice a day.
It's as uncomplicated as a toy but it packs
a wallop—all the power you can use for
light or heavy switching. It's so easy to
operate and so foolproof that even women
can learn to handle it skilfully in a few
hours. Besides costing less to buy, the
Porter Fireless costs next to nothing to
operate and maintain. Write for estimate.

NO FIRE

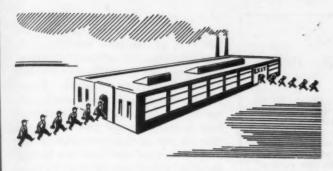
NO SMOKE

NO NOISE



ONLY PORTER BUILDS A COMPLETE LINE OF LOCOMOTIVES

H. K. PORTER COMPANY, Inc.
PITTSBURGH (1) PENNSYLVANIA



A Problem of National Import . . .

News OF Industry

Turnover of Labor Rising Despite WMC Rulings and Red Tape; No One Wants to Be Common Laborer

• • • The rise in industrial labor turnover, principally common labor, is unabated despite various WMC rulings and red tape, according to studies made by regional editors of this magazine, whose reports are published below. The causes are many and can be understood in the light of today's wartime conditions. They even include over-optimism regarding the end of the war—a factor sending hundreds back to their "home" jobs with individual post-war plans.

Worker turnover figures long have been a matter of controversy. They do not tell the whole story and they are compiled in various ways. Nevertheless, some specific jobs requiring unskilled or semi-skilled workers have been filled many times since the war began. Presumably all the quitting employees had to obtain certificates of availability (job releases). Therefore if time and money are being spent in the furnishing of the certificates it would appear that they are purely wasteful expenditures.

To some extent, poor selection of employees, poor specific training and the improper assigning of duties have been factors. Records appear to indicate that frequency of quits is higher with women than men.

In some areas it is almost impossible to obtain and hold common labor because most men and women believe they are above that class.

Turnover Rate in Steel Sharply Higher

Pittsburgh

• • • Despite the efforts of the War Manpower Commission to tighten up on job changing and thus reduce labor turnover, latest available figures for steel companies here, through June, indicate a steady increase in labor turnover. Steel labor turnover is four to five times as great as in 1941.

Discounting the new employees which must be hired to replace inductees, some steel companies had to hire three to six more employees per hundred on the payroll in June in order to maintain the regular force.

Skilled workers in the steel industry probably are not quitting their jobs at any greater rate than they were before the war. The turnover figure which, on an annual basis in June, was running between 36 per cent and

65 per cent, is accounted for largely by tremendous job changes among the unskilled and semi-skilled workers. Some specific jobs in these categories in the steel industry here have been filled many times in one year. Despite the WMC rulings which are not readily understood by most workers, floaters continually are changing their jobs.

Back in 1941, the turnover rate in the steel industry ranged from 0.9 per cent to 1.1 per cent a month. In June of this year it had reached 4 per cent for that month, and some steel plants were running from 4.5 to 5.5 per cent. This June figure contrasts with about 2.5 per cent a month, earlier in this

year.

Whether or not the July and August figures will show a downward trend, cannot be determined at this time; but from all indications the decline will not be significant. As labor gets shorter and shorter unskilled and semiskilled workers find bigger and better opportunities to pose as skilled workers and thus get high pay. Plausible stories of their value to the war effort are bound to be accepted if there appears to be a shred of truth to them. This situation tends to keep the extremely high turnover in motion in the less desired occupations. If a man is discharged, he needs no certificate of availability nor does he need one if he lays off for 60 days. On the other hand, if he can prove that he is more valuable to the war effort elsewhere, or that his skill is not being completely utilized, he stands a No. 1 chance of obtaining permission to change his job.

Scramble for Peace-Time Jobs Reported

New York

• • • Optimistic war reports are causing a scramble for peace-time jobs and this is a cause of labor turnover in war industries, according to one responsible authority of the United States Employment Service. Other observers are freely predicting inauguration of controlled referral hiring plans in major war production centers

and the institution of a National Service Act before Christmas.

Absenteeism, long the No. 1 manpower problem, now has attained a running mate in what is termed labor turnover. Hiring and quitting of workers over the nation has reached an amazing proportion. Yet, tremendous as the labor turnover total appears, it does not seem, in the opinion of the USES executive to be as guilty of hurting production as absenteeism although each is co-responsible in certain ways for the other.

One evil charged against labor turnover has been that of labor hoarding (also a cause of absenteeism). Labor hoarding is adopted in some plants in order to cushion the work force against personnel absences and thereby maintain the production program.

The hoarded labor pool has supplied a very popular reason for quits. Records of the USES in this area show that applicants for "exit releases" from jobs have, in a high percentage, claimed "not enough work" or have requested a shift to jobs more fully employing their highest skills.

Many companies flatly ascribe high turnover to the effects of the draft. Records of an Eastern war plant recently surveyed would seem to disprove this.

This Eastern plant complained of having hired about 70,000 workers for a total gain of 40,000-a figure not considered too bad, incidentallyand pleaded for assistance in overcoming the onslaught of the military draft. The USES after installing the replacement schedule system in the plant found after a six-month survey that separations had dropped during the second three months by 21 per cent. However, while losses due to military call fell off 74 per cent, showing the effectiveness of the replacement schedule system, the company's quits rose 16 per cent and discharges increased 12 per cent. Thus, where a plant as much as said, "give us relief from draft calls and we will do the rest," the plant's own endeavor to prevent excessive separa-

Hired: 150,000; Net Gain: 20,000

San Francisco

• • • West Coast shipyards on Liberty ship Maritime contracts had an average labor turnover for the first six months this year of 120 per cent. Women have a slightly higher turnover than men. Only 10 per cent of the turnover is occasioned by the draft. LaMotte T. Cohu, board chairman of Northrup Aircraft Corp., and president of the Aircraft War Production Council states that West Coast aircraft companies hired 150,000 for a net increase of 20,000 workers in the first six months of this year.

Except for unskilled laborers

Except for unskilled laborers and newly arrived Negroes and migrant labor, turnover seems higher in largest companies even though preferential wages prevail. Housing, transportation and management seem to be the governing factors. Skilled workers and well established firms have the best performance and personnel records.

tions failed to produce and the draft was proved not to be the major trouble.

Closely following over-optimism as a cause are such reasons as poorly selected employees or poor selection of duties, initial lack of understanding of the type of work involved on the part of the new employee and the usual factors of health, family troubles, housing, transportation, etc.

Evidence that poor selection of employees and duties for new employees has been a factor in increasing turnover is found in the fact that more than 75 per cent of severances occur in workers employed from one to two months. Records show that the frequency of quits is higher with women than men to the tune of about three to one.

New employees, both men and women, frequently do not understand what type of work is expected of them. Too often new employees have little chance to select the type of work they will do and are frequently put on undesirable jobs. Women, many of whom have never worked at a job, have more trouble than men in acclimating themselves. Longer training periods, greater choice in the type of work to be done and a period of orientation have been suggested as remedies.

To employ women successfully, one observer says, not only equal pay but also certain concessions must be made for women considering that in a high percentage of cases a woman not only does a day's work in the plant but also has at least some household duties to maintain.

Heavy Industries Rate Highest in Ohio

Cleveland

• • • With the national labor turnover rate running approximately 7 per cent of employment, four major industrial areas in Ohio average somewhat below this rate. The rate of labor turnover is unquestionably highest in the metal foundries and forge shops throughout the state, averaging close to 10 per cent of employment, but this rate is tempered downward by other types of industrial activity. The type of work is undoubtedly the reason for the high labor turnover in these industries. It is usually hot. heavy work which many newcomers into industrial fields cannot withstand. Consequently, the rate of separation from these industries is consistently higher than in any other specific type of work.

From a regional standpoint, the areas hardest hit by labor turnover are the WMC designated Group I Critical Labor Shortage Areas, which at present are Detroit, and Muskegon, Mich., and Akron, Ohio, in this WMC region. Generally speaking, wage rates have less to do with labor turnover than could be expected, because a worker quickly finds his highest level and remains there.

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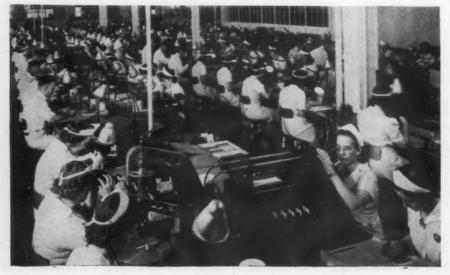
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Up until the recent ban on in-migration of labor into Cleveland, which

WOMEN ARE TOPS: Women binocular assemblers in this Mansfield, Ohio, plant of Westinghouse have proved more efficient than men.



is far from complete, the rate was about 5000 per month, while currently 10,000 per month are coming into Detroit, and 2000 a month more into Akron.

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In an effort to stabilize labor turnover and keep it to as low a level as possible, the WMC, through the United States Employment Service, inaugurated the "statement of availability" plan whereby an employee needs such a statement from his latest employer or the USES in order to take another job. In every area that this labor stabilization plan was put into effect, the immediate reaction was a very sharp drop in labor turnover for a short period followed by a resumption of the upward trend, but this is below the national turnover rate in every case.

The most serious manpower problem in the Youngstown-Warren area is the shortage in unskilled labor. Such help in steel mills, foundries, forge shops, heat treating departments, etc., is already critical, and district needs are expected to exceed supply by nearly 10,000 by Jan. 1, 1944. Following closely are the shortages of welders, machinists, and skilled or semiskilled foundry help in this district. In the Cleveland district the demand for unskilled labor has become so acute that several plants are hiring men on a daily basis, paying them at the end of each day's work.

Labor turnover in the Cleveland area is somewhat stabilized between 6 and 7 per cent of employment. In March and April it was 6.1 per cent; May showed 7.2 per cent; and June was down again to 6.4 per cent. Steel plants in the district during March, April and May were under the district rate, averaging 5.6 per cent but June saw a jump to 8 per cent. This was attributed mostly to hot weather and the normal summer month slackening up of steel plant operations.

Akron is unquestionably the most critical labor area in Ohio. Worker morale is bad, resulting from rather poor labor-management relations, very aggressive unionism, and the efforts of management to decentralize the rubber industry. Unskilled labor is practically non-existent, with current estimates indicating that 7000 workers from outside Akron are needed. Inmigration into the area, compared with total employment, is very heavy, but the number of people moving out of the area is just as great. Labor turnover in March and April averaged 5 per cent of employment; in May just under 5 per cent; and June

compilations indicate that it was again 5 per cent of employment.

There is one factor, however, that affects the labor supply situation in Akron. That is labor utilization, which is reported to be very bad. Plants have workers that, while employed full time, are not kept busy, making for lowered worker morale and resulting absenteeism, dissention,

and strikes. A good example of this is in the Goodyear aircraft factory, where at present employment is about 33,000. It is believed that with proper labor utilization, this figure could be cut by at least 10 to 15 per cent.

The general shortage of unskilled labor throughout the Ohio area, while very acute at present, will be further aggravated in the next few weeks when young boys return to school. WMC officials believe that if all hiring is done through the USES,

TOTAL YEARLY LABOR TURNOVER RATE
IN REPRESENTATIVE PLANTS OF 144 INDUSTRIES

(PER 100 EMPLOYEES)

HIRINGS

SEPARATIONS

The Iron Age
1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943*

* Project from first six months record

control could be maintained on where specific types of help are placed at work. In this way WMC could place men on jobs that only men can do and women on the lighter jobs, thus easing the critical labor situation. Further than that, there is the possibility of the WMC issuing a list of occupations that will be reserved entirely for women, and ordering that only women fill these jobs. This will likewise place a greater supply of men in the hands of USES for distribution to heavier industry jobs.

Separation Rate High at Chicago

Chicago

• • Manpower turnover among this area's 1,000,000 workers slipped off during May and June to 11.2 per cent from 13.4 per cent during March and April, War Manpower Commission's bi-monthly report shows. July and August figures are not yet available but individual war plants are still attempting to iron out such basic

difficulties as housing and lack of transportation.

Some groups of labor and management do not see eye to eye with the Federal government's attitude that 1½ hr. traveling time from home should be an index below which no federal sponsored projects will be allocated. It is estimated that the Chicago area is short from 2000 to 3000 housing units.

Increased hiring of women has brought varied results in turnover and absenteeism. A non-ferrous metal plant reports absenteeism less for women than men. An aircraft engine plant states that absences are more requested but turnover lower among female workers.

Institution of optional four hour shifts by the Aluminum Co. of America LaGrange plant in an effort to attract off-hour business men and housewives has brought more men than women applicants in the first three weeks. The Alcoa experiment is drawing careful study from other plants.

Ho-hum . . Let's Strike!

Buffale

• • • "A few men wanted to take a day off," was the quaint explanation given by a United Steel Workers official of a one-shift strike involving 120 workers in the steel conditioning department of Republic Steel Corp., Buffalo. It was the third strike in a single month in the same department. All were "unauthorized."

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Some attention is still being given to the possible substitution of two 10-hr. shifts for the usual three eight-hour

shifts, although labor is generally cold to the idea. One aircraft engine plant

is running a half crew on Sundays.

Turnover Serious: Government Aid Asked

Birmingham

• • Labor turnover is a serious problem in the iron and steel industry of the Birmingham district and with its twin evil, absenteeism, is a drag on war production in the area.

As a specific example one important plant which employs about 275 workers was forced to hire 40 men in August to meet its labor turnover. For that plant, the labor turnover problem is more serious than it was at the beginning of the year. During January, with approximately 275 men employed, about 25 men were hired to keep the employment figure at the 275 mark.

One of the most important war plants in the South, which employs approximately 900 men, was forced to hire 50 to 60 men a month during May, June, July and August. During

March and February when there was no unrest over contract expirations and when conditions were more comparable to the past four months about 40 men a month were needed to fill the places of men who had left.

Much of the labor turnover in the Birmingham district is laid to workers who will not stay with one company for as long as 60 days; workers who seem to believe that they can obtain more money elsewhere without endeavoring to get the experience and training that would warrant higher wages from the companies they leave.

At least some of the companies here that are experiencing high labor turnover problem, believe that more effective governmental action than now exists, whether it be directed against the worker, companies, or both, must be forthcoming if the problem is to he eliminated.

record-high totals. Anticipations are that a peak, sometime next spring or a little later, this city and its surrounding areas will require approximately 840,000 men and women workers in war plants and essential manufacturing. Today it has about 760,-

One major producer, midway between the largest and the smaller ones of Detroit, had a separation rate of 6.5 per cent during July, 1943, compared with 5.4 per cent in July, 1942. Quits accounted for 5.5 per cent. This company was hiring 73 men in July for every 65 separations.

In a larger plant the rate of quits advanced from 3.1 per cent in July, 1942, to 3.9 per cent in July, 1943.

Separations due to factory workers joining the services have held fairly constant during the past year in Detroit, the June figure of 0.7 per cent per month being just about in line with earlier reports.

Personnel men make mention of the fact that the quit rate among women has gone importantly upward.

Referral Hiring Plan Aids Turnover Problem Buffalo

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• • Labor turnover in the ordinary sense has been whittled down in the Buffalo area by the War Manpower Committee's referral hiring plan, which precludes any haphazard hopping from one job to another, and by the fancy rates being paid workers in the airplane and other war factories where there is little "muscle" work. The heavy industries alone have suffered critically from turn-

However, the referral plan has not reduced discharges to a minimum and current estimates are that 900 to 1000 workers are fired outright each month in the Buffalo industrial district. Some of these dismissals are deliberately provoked by workers hoping to get away from a "heavy" war plant to a "light" one despite the fact that under the referral plan no male applicant for work can pick his spot.

A new subterfuge to avoid assignment to the hard hit heavy industries is being used by many USES applicants. This is a doctor's certificate attesting that the worker cannot do heavy work. It is reported that applicants are presenting such certificates in carbon copy, showing that some doctors are issuing them in quantities. In one quarter it is heatedly asserted that some of the papers are being signed by doctors' nurses.

Detroit Rate Higher Than Last Year

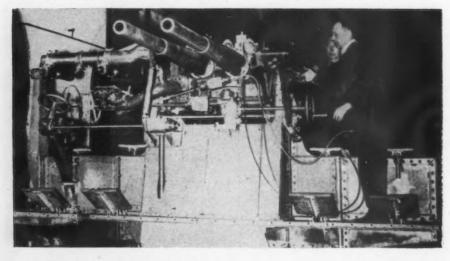
Detroit

• • • Manpower turnover in the Detroit area appears to be continuing at a steady pace, on a level which is definitely over the one prevailing last year at this time.

Separations for all causes in major war plants of the area have been running between 5.1 and 6.5 per cent of payroll per month since the start of this year, June's proportion being 5.9 per cent. For June, quits accounted for 3.9 per cent, separations to join the services, 0.7 per cent, and for other causes, including discharges and lavoffs, 1.4 per cent.

This situation has severely retarded efforts to augment payrolls to new

NAZI SURPRISER: This twin muzzled six pounder was developed by the British to deal with invader small craft. Just off the secret list, this gun has a high muzzle velocity, is deadly at 5000 yards and fires high explosive projectiles. Its turnet turns within 300 deg.



All-out Drive for Scrap Is Set; Industrial Material to Play Biggest Role

. . Another all - out nation - wide campaign for iron and steel scrap is scheduled to be held Oct. 1 to Nov. 15 to build up inventories, according to Paul Cabot, retiring director of the WPB Salvage Division. "Victory Scrap Banks" will be created in towns and cities, and the auto wrecking campaign will be pushed. But the biggest impetus is expected to come from industrial salvage, which is expected to yield 9,800,000 tons out of the 15,-000,000-ton goal for collections in the last six months of 1943. The total goal is slightly higher than in the corresponding six months of 1942.

According to Cabot, steel companies

and scrap dealers have indicated the need for a campaign. It is recognized that the job will be tougher than it was a year ago.

The scrap sub-committee, of the WPB Steel Division, which consists of representatives of consuming mills, unanimously agreed to back up any all-out collection drive for metal scrap that the WPB sees fit to put on.

In a letter to executives of all steel mills, John T. Whiting, Director of the steel division, urged the management of every plant to give full cooperation and unqualified support to any local salvage committee activities. "In view of the factor of national

safety involved," Mr. Whiting said, "and the need for safe-guarding and assuring an adequate supply of scrap to maintain production in pace with our military program, such cooperation with any and all salvage drives is highly important."

At the sub-committee meeting Sept. 2, held in Washington, the individual members representing consuming mills expressed grave concern about the situation. "We are very dependent on scrap and are disappointed because we have not been able to build up a larger inventory to safeguard us during the winter months," said Leigh H. Block, representing Inland . Steel Co. A feeling that the scrap situation is most serious was expressed by Newman Ebersole, representing American Rolling Mill Co.

Metals Reserve to Aid on Interchange

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• • • Steel companies are to share with the Metals Reserve Corp. the cost of moving 30,000 tons of steel ingots monthly from the open hearth furnaces of companies who do not have the finishing capacity to utilize them to companies where there are open spaces in their finishing mill schedules.

The foregoing facts were made known to all steel producers and to all operators of blooming mills by a letter on Aug. 28 by John T. Whiting, WPB Steel Division Director, who told producers that they might from time to time receive instructions to purchase ingots from some producer with accompanying direction to fabricate that steel into some specific product urgently needed for the war.

When the cost of the steel is in excess of the generally prevailing ceiling price; or when the freight involved is in excess of switching charges, or when the acceptance would work an "undue hardship," the steel company involved may certify this fact to the steel division. After certification, the steel division transmits the entire case to the Metals Reserve Corp. with the recommendation that the Corporation purchase the steel and resell it to the company at its f.o.b. plant ceiling

In his letter Mr. Whiting said: "The question arises primarily because new ingot producing facilities will be and it is essential that all possible steel production be utilized for the war effort. To do so, it will be necessary to move ingots from one producer to another for further processing.

"The interchange of ingots may involve an abnormal cost on the proavailable before finishing facilities ducers taking them which will in gen-

eral amount to the freight charge for moving the ingots from the producer to the processor. There is a strong feeling within WPB that industry would and should absorb the differential involved, except in such exceptional instances as the movement from the West Coast where high freight charges are involved and the tonnage is large."

Surplus of Alloy Steel Brings WPB Plea

Washington

• • • An alloy steel surplus, through a rapid completion of the electric furnace program, is causing WPB to ask the Army and Navy and all claimant agencies to specify 150,000 tons monthly of electric furnace steel. WPB points out if the claimant agencies want more carbon steel they will comply with this request inasmuch as for every ton of alloy steel produced in the open hearth, one ton and one third of carbon steel can be made.

John T. Whiting, director of the Steel Division, pointed out electric furnace capacity has jumped from 150,000 tons a month in 1940 to 328,-000 tons this July. By the end of this year, the estimated monthly capacity will be 471,000 tons.

"Big Inch" Breaks Are Not Excessive

New York

• • • Leaks in the Texas to New York "Big Inch" pipeline have aroused many rumors. However, an investigation into the facts leads to the conclusion that the rumors are wrong.

First reports of possible sabotage were exploded quickly when old time pipeline men said that the leaks occurred strictly because of minor failures in the pipe itself. These same observers said that the number of failures was not uncommonly high for a line of that length and might have run as high as 15 without being above normal.

If any lesson is to be drawn from the experience with the line it might be found in the fact that the 24-in. seamless line from Texas to Phoenix-ville, Pa., developed only one pinhole which was discovered on the initial air test while the welded 20-in. line developed three leaks in its 135-mile course. course.

New Directive Specifies Use of NE Aircraft Steels Replacing Alloys

Washington

• • • A new steel conservation directive, 3A, prepared by the WPB Committee on Aircraft Materials Conservation which outlines the use of NE steels to replace alloy steels in aircraft construction wherever possible received the approval Aug. 12 of the Army Air Forces, Navy Bureau of Aeronautics, Aircraft Resources Control Office and Aircraft Production Board of WPB. It was issued by the Operating Committee on Aircraft Materials Conservation.

The following Army-Navy Aeronautical Specifications have been issued and are acceptable to the Army Air Forces and to the Bureau of Aeronautics as indicated below, contingent in all cases upon the mechanical properties specified for the intended applications being obtained by proper heat treatment and upon model tests, when required, being satisfied.

Approved Specifications

A. Bar and Rod

(1) AN-S-13, steel, bar and rod (.18 to .23 C) chrome-nickel-molybdenum. Equivalent to NE 8620. Primarily for carburizing, as an alternate for such steels as SAE 2317, 3120, 4119, 4620 and 6120 where the desired properties of the core can be met as stated above.

core can be met as stated above.

(2) AN-S-14, steel, bar and rod (.27 to .33 C) chrome-nickel-molybdenum. Equivalent to NE 8630. Acceptable as εn alternate for AN-QQ-S-684 (SAE X4130) in all applications including those requiring fusion welding, where the latter steel has been satisfactory. The gas and arc fusion welding properties of the emergency steel appear to be at least as good as those of X4130 steel and in general

the former requires slightly less total heat when gas welded, and shows a narrower zone of maximum hardness when arc welded. This emergency steel is also acceptable as an alternate for SAE 2330 (AN-Q-S-689), 3130, 4037 (AN-S-9), and 6130, subject to above conditions.

and 6130, subject to above conditions.

(3) AN-S-15. steel, bar and rod (.33 to .38 C) chrome-nickel-molybdenum. Equivalent to NE 8735. The properties of this steel are intermediate between those of AN-S-14 and AN-S-16, the latter as described in 2A(4). The comments in paragraph 2A(4) pertaining to the use of steel with lower molybdenum range apply here also.

of steel with lower monyouchum range apply here also.

(4) AN-S-16, steel, bar and rod (.38 to .43 C) chrome-nickel-molybdenum. Equivalent to NE 8740. Similar welding characteristics to SAE 4140 steel. Acceptable, subject to above conditions as an alternate for the steels already mentioned above, if necessary to obtain specified higher mechanical properties in larger sections, and for such steels as SAE 2335, 2340, 3135, 3140 (AN-QQ-S-690), 4135, 4140 (AN-QQ-S-687). In view of the current shortage of molybdenum, it is desirable that arrangements be made with the steel producers to aim for the lower range of molybdenum, i.e., .20 to .25 per cent.

Attention is invited to the introduction of a new NE steel of the 8600 series to be comparable to NE 8740 but with a molybdenum content of .15 to .25 per cent, intended to conserve molybdenum even further. Although steel conforming to AN-S-15 and AN-S-16 will continue to be available for aircraft uses, it is desirable that where new tests for new applications are to be conducted, consideration be given to testing compositions of the .15 to .25 per cent molybdenum range wherever practicable.

B. Sheet and Strip

(1) AN-S-12, steel, sheet and strip (.27 to .33 C) chrome-nickel-molybdenum. This is the same steel as described in

paragraph 2A(2) above and is intended primarily as a weldable alternate for SAE X4130 sheet and strip (AN-QQ-S-

SAE X4130 sheet and strip (AN-QQ-8-685).

(2) AN-S-22, steel, sheet and strip (.33 to .38 C) chrome-nickel-molybdenum. This is the same steel as that described in paragraph 2A(3) above and is intended primarily as an alternate for SAE 4135 sheet and strip (AN-QQ-S-686). The comments in paragraph 2A(4) pertaining to the use of steel with lower molybdenum range apply here also.

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C. Tubing

(1) AN-T-15, steel, tubing, seamless (.27 to .33 C) chrome-nickel-molybdenum. This is the same steel as described in paragraph 2A(2) above and is intended primarily as weldable alternate for SAE X4130 seamless tubing (AN-WW-T-S59).

(2) AN-T-33, steel, tubing, welded, (.27 to .33 C) chrome-nickel-molybdenum. This is the same steel as described in paragraph 2A(2) above and is intended primarily as a weldable alternate for SAE X4130 welded tubing (AN-T-3). Provided the inside flash does not interfere with its intended application, this tubing and tubing conforming to AN-T-15 (Paragraph 2C(1)) are accepted as being interchangeable for all applications.

(3) AN-T-22, steel, tubing, seamless

(3) AN-T-22, steel, tubing, seamless (.33 to .38 C) chrome-nickel-molybdenum. This steel is the same as that described in paragraph 2A(3) above and is intended primarily as an alternative for SAE 4135 seamless tubing (AN-WW-T-852). Comments in paragraph 2A(4) pertaining to the use of steel with lower molybdenum range apply here also.

The nickel content in the above mentioned specifications is being increased from a range of .40/.60 to a range of .40/.70.

Washington

• • • The types of aircraft materials and parts which may be transferred from the inventory of one aircraft manufacturer to another have been considerably broadened by WPB. This action was contained in an amendment to Directive 16, which places in the hands of the Aircraft Scheduling Unit, Wright Field, Dayton, Ohio, authority to effect transfer of aircraft inventory items.

The original directive was issued April 24.



CO-ORDINATED A TION: To encourage the use of high econ my and high produ tion methods the Ope ating Committee Aircraft Materi Materia Conservation has sued numerous recommendations conservi manpow materials. and facilities.

OPA Decision on Higher Ore Prices Expected Soon; Compromise Boost Possible

Pittsburgh

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• • • • After several months of rumbling on the part of Lake Superior ore mining companies, followed by detailed cost studies, the OPA will, within the next two to four weeks, render a decision on the controversial question (IRON AGE, April 1, page 87) of higher ore prices. It is

Ford one mine granted price boost. See page 80.

believed practically certain that they will be advanced, although this week, the final decision had not been completely reached. The OPA is on the "home stretch."

Thus, the ore fraternity is about to get an answer to its most important question. There is no doubt that some sort of a compromise increase will be granted. But the ore companies want more. Their prices not only are governed by a ceiling price on newly mined ore, but all price levels of the various companies which were in effect in 1941 were frozen by the OPA in 1942.

The present ceiling price on Lake Superior non-bessemer Mesaba ore is \$4.45 a gross ton, for newly mined ore. This price was the so-called published quotation in 1941. In the same year, it is estimated, that the average price of spot and contract ores was \$4.24 a gross ton. In seeking a new ceiling, the ore mining companies wanted a price ranging from \$4.75 to \$5.00 a ton. It looks as if they may get a new ceiling price of \$4.60 a ton or slightly more, since it is usually the policy of the OPA to compromise on specific requests for price relief.

However, the ore companies are known to want a ceiling and nothing else. This would, in effect, unfreeze the levels which have been set for the companies on the basis of their 1941 sales, for material other than newly mined ore. Whether they will get this remains to be seen, but it is far better than an even bet that the OPA will give up the vertical freezing method which was applied to iron ores and allow a straight ceiling price as has been done on steel and pig iron.

When ore prices were frozen in 1942, many companies, because of competition, etc., were caught with sales prices below the so-called published price. That is the reason why the "sacred" published price in 1941

was \$4.45 a gross ton, whereas the average spot and contract price at that time was about \$4.24 a gross ton. When the freezing order came, there was no time for many companies to jack their quotations up to the published price; hence, they have had to remain ever since at the 1941 level. A few small adjustments have been made for at least three of the smaller ore companies, to compensate for cost difficulties. Also, some ore mining companies have been able to obtain a higher average price because of bringing in new mines since 1942.

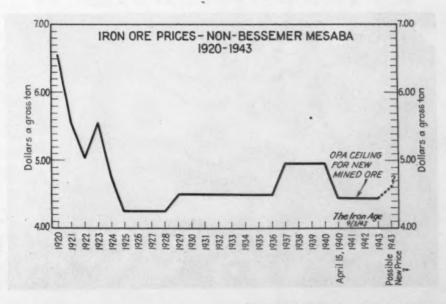
It is believed that due to new mines being brought in, with a consequent readjustment by a weighted price average, made up with new and old mined ores, that the average spot and contract price in the ore industry today is close to \$4.35 a ton. This has tended to minimize the price differentials between the various companies and, hence, increased cost factors have borne as heavily on one company as another.

The Iron Ore Advisory Committee, after a considerable number of meetings with the OPA, has apparently convinced the latter that there is not much if any slack left between selling prices and costs. The ore mining companies have claimed, with substantial evidence, that labor increases, higher supply costs, and transportation taxes have made a price increase an absolute necessity.

The delay in reaching a conclusion on the ore price question rests primarily with the ore mining companies and not with the OPA. Several months ago, when there was considerable talk about the need for a price increase, THE IRON AGE predicted that no advances would be allowed until the companies submitted detail cost data to OPA. Despite the clamor for relief at that time, only one major ore mining company had presented its case for higher prices to OPA. Four smaller companies had their problems before OPA at that time, and all were granted some form of relief.

Apparently losing some of its ageold reticence, the ore industry finally,
through its advisory committee, began
a series of meetings with OPA, which
culminated in a major detailed price
and cost analysis. It is expected that
when the ore mining companies are
granted relief in the next few weeks,
any price increases allowed will become retroactive for the 1943 season,
which in some measure will help ameliorate the increased labor costs which
the ore companies had to absorb because of a retroactive War Labor
Board decision.

It is certain that as soon as the ore price situation is clarified the OPA, figuratively speaking, will have a knock on its door, bright and early the next morning. This knock will be administered by the pig iron fraternity, which has been biding its time, although gnashing its teeth, over some selling prices. Again, there is little or no chance for any overall adjustment in pig iron prices until a complete cost study is made. If and when relief is granted to a great number or all pig iron makers, OPA will then face a price barrage from the steel industry, which has been licking its wounds recently as red figures show up on many regular items.



New Plan Being Mapped by WPB For Critical Non-Controlled Materials

Washington

• • • • WPB's latest distribution plan is CAP, or Coordinated Authorization Procedure. CAP is designed to eliminate hundreds of applications for critical non-controlled materials by permitting a manufacturer to make one application for such items.

CAP is still in the consideration stages. On Sept. 1 copies of the scheme were sent to the claimant agencies for review and comment.

The size of the paper dam CAP is supposed to dynamite is 75,000 pieces which flow in and out of WPB weekly. WPB industry divisions are already opposing the simplification of their functions and are trying to side-track CAP. However, the percentage of the paper work CAP may eliminate is not known.

Further purposes of CAP are to authorize a manufacturer to buy materials in quantities integrated with his production requirements and to relieve the manufacturer from having to repeatedly justify to different individuals the importance of his product as well as the quantities of materials required by his production schedule.

Another point in favor of CAP is that there will be a standardization of the criteria under which applications for controlled materials are judged when the plan is made effective. At present, a variety of standards are in use so that the smooth integrated flow of materials in keeping with production schedules approved by WPB and the claimant agencies is made difficult.

Some opposition to CAP comes from officials in WPB who point out that the new plan is PRP-like—would do away with allocation of many materials.

WPB's new proposal is to provide a single quarterly application on which each consumer is to state his requirements for a selected list of production and MRO materials in relation to production schedules. This permits a tabulation of total demand for each listed material for comparison with supply.

Requirements would be transmitted to the industry division given the responsibility for recommending to the Requirements Committee the quantities to be authorized for each product group. Subsequent determinations will be made by product groups

Applications will be classified into two groups on the basis of size of requirements for each material. The relatively small number of applications accounting for the bulk of the materials will be accorded careful analysis. WPB says processing time will be considerably reduced by handling on a mass basis under general directions the relatively large number of small applications.

A "small order" provision will be made part of the plan.

CAP's scope will include all materials and products now under separate allocation, procedure or under special control effectuated by requiring the filing of an application form through the provisions of a WPB order or regulation, except CMP materials.

Application will be mandatory for the selected materials and existing allocation procedures abolished.

MRO Procedure for Steel Firms Is Set

Washington

• • • WPB Steel Division Director J. T. Whiting has sent to all steel and iron producers a copy of Preference Rating Order P-68 (revised) describing the procedure by which a producer obtains materials for maintenance, repair and operating supplies. The or-

der provides that serial numbers may be assigned to producers of the materials or products listed in Schedule A of the order. Only those producers whose quarterly uses of controlled materials are in excess of \$5000 need apply.

Those producers whose uses of controlled materials are less than \$5000 quarterly may continue to procure maintenance, repair and operating supplies through CMP Regulation No. 5. Application for a serial number should be made by letter to the Maintenance and Repair Section, WPB Steel Division. Producers using less than \$5000 worth of controlled materials quarterly, who are not required to apply for a serial number, should notify WPB, using the same address.

Upon approval of an application, a serial number will be assigned and producers will be sent copies of Form WPB-1907. Where a producer operates more than one plant, the application should indicate whether or not it is desired that a serial number be assigned to each plant or to the group of plants. Extraordinary maintenance and repair, as defined in the order, or replacements valued at more than \$2500 are to be covered by application on Form WPB-3196.

(MORE PROPRITIES NEWS ON PAGE 134)

DEWEY'S FIRST MILL TRIP: The first time New York's governor, Thomas E. Dewey, ever saw a steel mill was when he went through the Buffalo plant of Republic Steel Corp. last week.





The railroads of the country have proved themselves miracle workers in the transport of war goods. An equally remarkable accomplishment is heralded for the post-war economy.

Soon to be on the drafting board are designs for rolling stock that will make possible transportation of passengers and freight at the lowest per mile cost ever known.

Steel, as always, will be the basic element in this further advance: for steel, properly alloyed, or properly surface protected, provides resistance to the elements beyond that accomplished by any other material.

Steel also provides resistance to fatigue, to shock, to temperature changes, that is bound to make it the reliance of the future just as is has been of the recent past.

Pressed Metal Parts and stampings will be used by the railroads, and by numerous other industries of the country because of their low cost, their broad range physical characteristics, their aid in the creation of beauty, and for their other well known qualities that has called for the tonnage in the past.

Parish Pressed Steel engineers will be found cooperative and helpful. Why not call on us while your plans are in the preliminary stage.

METAL STAMPINGS

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AGE 134)

MODERN DESIGN AT LOW COST



PARISH PRESSED STEEL CO., Reading, Pa.

Subsidiary of SPICER MFG. CORP.

Western Representative F. Somers Peterson, 57 California St., San Francisco, Cal.





YES, these were received and shipped to a well-known California Shipyard, totaling over 275,-000 ft.

Repeat orders from "MAJOR" WELDING CABLE from six leading Shipyards, totaling over 1,000,-000 ft.

The quality of "MAJOR" WELDING CABLE has been proven in leading welding industries, and wherever steel is fabricated.

The rubber jacket is extruded, and cured by continuous vulcaniza-

tion which insures high quality. The flexibility is obtained by many fine wires properly stranded as the conductor.

WELDING ENGINEERING COMPANY

MANUFACTURERS - - DISTRIBUTORS

MILWAUKEE 2, WISCONSIN

Offices and Agents all over the United States

WPB Issues Rules for Reproducing Forms

• • • Simplified general rules governing the reproduction of WPB forms and orders have been established in Priorities Regulation No. 5, as amended Aug. 23, the WPB announced recently.

Any person may reproduce any WPB form, order or regulation, but a form must, when reproduced bear on its face the words "specimen copy" or "information copy" in letters not less than 1-in. high or in 36 point caps; if it falls into either of the following classes:

(1) Forms or orders which are designed to be issued by any government agency and which have not yet been signed by the government agency. For example, Form GA-146 which is used by various industry divisions of WPB to authorize purchase or sale of particular goods. The limitation does not apply to forms which are both designed to be filed with the government agency and later to be issued to the applicant by the government

DIRECTOR: New photo of Haron Boeschenstein, director of Production Controls Bureau of WPB.



AMERICAN METAL PRODUCTS COMPANY

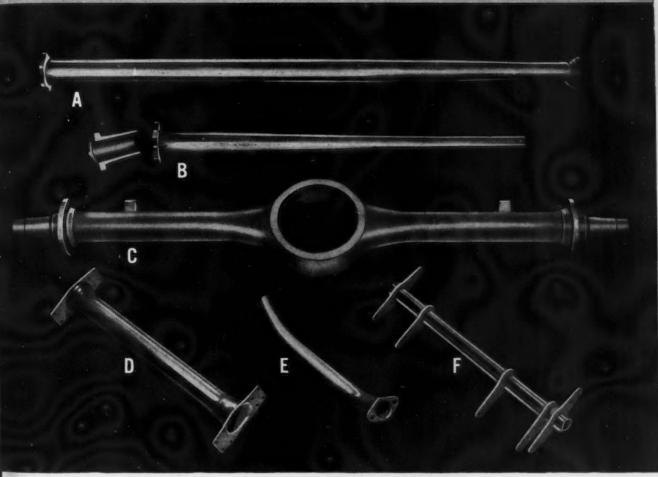
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DESCRIPTION OF PARTS: A—One Piece Torque Tube. B—Torque Tube. C—Rear Axle Housing.

D—Frame Rear Cross Tube. E—Spare Wheel Carrier Arm. F—Brake Cross Shaft.

We are serving transportation manufacturers in war, as in peace, with quantity produced welded-steel tubular parts made by the hot and cold process . . . upsetting, forming, swaging, forging, welding, heat treating and machining.

AMERICAN METAL PRODUCTS COMPANY, 5959 LINSDALE AVE., DETROIT, MICHIGAN



Removing Broken Tap from Wright Crankshaft!

In the plant of one manufacturer of Wright crankshafts, "HARDSTEEL" drills are saving time and giving 100% parts recovery when taps break in blind holes.

FORMER PRACTICE

Grinding out tap with pencil grindertime 8 to 81/2 hoursfrequent loss of the part when grinder defaced threads.

PRESENT PRACTICE

Drill about 1/8 inch into tap with a "HARDSTEEL" drillenlarge hole by grinding-drill again-grind and continue until tap is cut out. Time 2 to 21/2 hours—no loss of parts.

This is just one of hundreds of applications where the ability of "HARDSTEEL" drills to drill, ream, countersink and counterbore steels hardened by any process pays big dividends.



Ask for a copy of the "HARDSTEEL" Operators Manual-24 pages of practical information that will prove the value of "HARDSTEEL" tools in any service shop. Free on request.

BLACK DRILL CO. • 5005 Euclid Ave., Cleveland, Ohio

"You Harden It ... We'll Drill It"

DRILLS . REAMERS . TOOL BITS . SPECIAL TOOLS

ment agency. For example, the limitation would not apply to such forms as WPB-541 (formerly PD-1A).

(2) Forms bearing a serial number designed to be filed with a governmental agency and later issued by the agency but which have not yet beer signed by the agency. A most common example of this class is Form WPB-542 (formerly PD-3A).

Forms may be reproduced by any process - photographic, printing, mimeographing, or otherwise-but the following conditions must be ob-

(1) If the forms are reproduced for filing with a government agency, the copy must be exactly like the officially published form as to paper size, format. and arrangement of paragraphs or tables on each page. The color of the paper must be approximately the same as official copy.

(2) Copies of all orders or forms bearing the signature of any official of the United States government any other authorized person must in clude the signature. This signature must be in type or print preceded b "(Signed)" unless the entire order certificate is reproduced by photo graphic process.

Harriman Mission Man Gets Post With CPRB

• • • The Combined Production Resources Board announced the pointment of W. M. Black of She Hills, N. J., to the office of executive director of CPRB. Mr. Black n turned some time ago from Londo where he was a member of the Ham man mission. Previous to going to London last October he was a specia assistant to Philip D. Reed, formerly director of industry operations WPB.

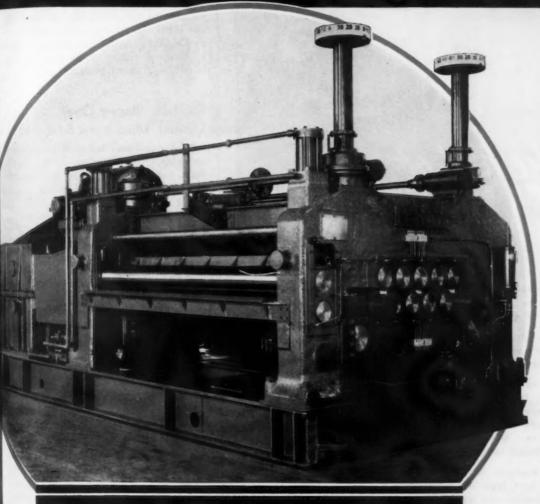
Late Allotments Charged With Hamstringing Farm Took

Pittsburgh

• • Farm equipment manufacture for the past eight months have b behind the "eight-ball" in obtaining steel requirements. WPB has alway been cooperative with them in gra ing steel allocations, but the difficu has been and still is that the all ments granted farm machinery buil ers have always been made too latel be of any value.

For example, the boost in the allo ment assigned farm machinery buil ers over the 60 per cent of 1940 1941 quarterly consumption for

HOT OR COLD UNIVERSAL ROLLER LEVELLERS



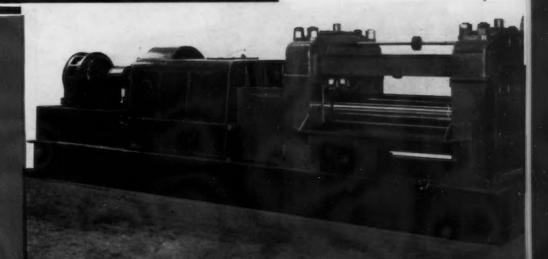
ACHINE CO.

SHEET. TIN AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

ASSOCIATE COMPANY THE WEAN ENGINEERING CO., INC. . WARREN, OHIO

Both of the levellers illustrated are turning out large tonnage of high quality material to hasten the day of "Unconditional Surrender."

QUIPMENT FOR LIGHT AND HEAVY PLATE



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executive
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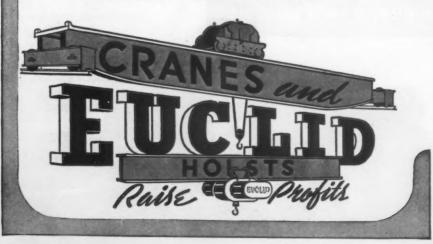
PARTIALLY because of this 15 ton Euclid Crane in the plant of the Maryland Drydock Company of Baltimore, more power in a greater number of vessels moves into the "bridge of ships".

It combines two essentials—speed to meet production schedules and smoothness of control to facilitate assembly operations.

Loads can be raised or lowered as the trolley moves across the bridge while the crane travels speedily lengthwise of the building. The operator has remarkable control in lowering engine crankshafts, cylinders, etc., slowly and safely into position during assembly operations. Greatly appreciated, also, is the auxiliary hoist for more efficient handling of light loads.

Other Euclid features include: liberally proportioned parts throughout, the best type of anti-friction bearings, advanced methods of lubrication and quick, easy facilities for inspection, adjustment or repairs. These features combine to afford a long life of service with remarkable freedom from shut-downs and repairs.

EUCLID CRANE and HOIST CO.
1361 CHARDON RD. • EUCLID, OHIO



fourth quarter of this year was made only about two weeks ago. This being the case, builders found themselves in the position of not being able to find steel producers who could or would take their orders for steel because rolling schedules were filled through to the end of the quarter. If the WPB had announced the allotment earlier, there would have been far less trouble in finding mills that would handle equipment builders' orders.

Controls Placed Over Lumber Machinery By L-311

• • • Control over the distribution and manufacture of logging, lumber, and wood products machinery and equipment is established by General Limitation Order L-311 issued Aug. 27 by the WPB. Among the types of machinery covered by the order are dry kilns and redriers, machinery for logging, saw and planing mills, veneer and plywood products, wood containers, and general woodworking machinery and equipment. Full listing of machinery and equipment covered is given in Schedule A, attached to the order. Effective date for restrictions on purchase orders is September 11th

Plumbing Replacement Ratings Boosted to AA-5

Washington

• • • The preference rating assigned for repair and replacement of plumbing and heating equipment was raised to AA-5 from A-10 by WPB Monday in an amendment to Order P-84. Action was taken to bring this rating in line with ratings assigned for needs of similar importance.

Plant Buyer Must Accept Labor Terms

• • • The purchaser of a plant, who in the bill-of-sale stated that he would accept any obligations which the labor agreement imposed upon him, has been unanimously directed by the National War Labor Board to accept the agreement that had been in effect between a union and the previous owner of the plant.

The case involves the Osbrink Mfg. Co., which brought a foundry plan at Los Angeles from the Menasco Mfg. Co.

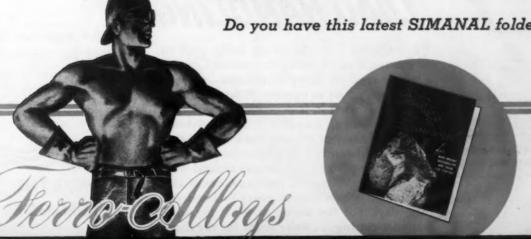
Twenty-two days prior to the sale. Menasco entered into a collective bargaining agreement with the Interna-

20% SI . . . 20% MN . . . 20% AL AN ESSENTIAL FERRO ALLOY IN ACID AND BASIC STEELS

for

- The elimination of alumina stringers occurring from the employment of straight aluminum.
- Better and more even distribution of existing inclusions throughout the heat and from heat to heat.
 - More uniform control of grain size in treated steels.

Do you have this latest SIMANAL folder?



Chicago

Tacoma



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Aug. 27 of maare dry for logveneer containng ma-

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The Free-Roving Tractor-Footed

assures you lowcost delay-proof

LOAD HANDLING

WHEN YOU HAVE heavy bulky stuff to move, load or stack, Roustabout Crane is a whole crew of husky stevedores - tireless, always ready, easy to operate. Where you want it when you want it, it prevents delays, keeps things moving. Handles 5 tons without a grunt. Wheels or crawler tracks, all tractor power, ball-bearing boom turntable, gears in oil, full swing boom. Invaluable around warbusy factories, airports, railroads, docks and warehouses, where they're going by hundreds these days. For fast action now . . . for postwar cost-cutting . . . write today for the facts.

> THE HUGHES-KEENAN CO. 571 Newman Street, Mansfield, Ohio

COUSTABOUT CRANES By Hughes-Keenan

ndling Specialists Since 1904

NEWS OF INDUSTRY

tional Molders and Foundry Workers Union, Local 374, AFL.

In the bill of sale between Osbrink and Menasco the following clause and

"Osbrink has read and is familiar win the terms of that certain labor agre-ment dated Feb. 6, 1942, by and betwee Menasco and International Moders an Foundry Workers' Union, Local 374, an Osbrink agrees to observe any obligation thereby imposed upon him as the pur chaser of the foundry."

In addition, the labor agreeme contained the following clause:

Article III. Assignability

Article III. Assignability
"During the term of this agreement is provisions, terms or obligations shall be affected, modified, altered or changed any respect by any change in the less status, ownership or management of the company, or any change, geographical otherwise, in the locale of its place of business. However, this agreement is massignable to any other labor organization."

The Osbrink Company was held to be bound by the language of the bil of-sale even though it later claimed should not be bound by it.

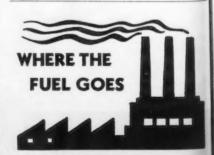
Calcium Order Suspended

Washington

• • • The allocation order which has controlled the distribution of metallic calcium since April 1, has been su pended until further notice by WPR At the time calcium was placed under allocation through Order M-303, it appeared as though a shortage would develop. Supply and demand are now well in balance. Most of the calcium used in this country formerly was made in Europe. Manufacture wa established in this country after war was declared and the supply is now ample.

OPA Appoints Truck And Bus Advisory Group

• • • Eighteen executives of firms engaged in the manufacture of trucks buses and trailers today were ap



ONE STEEL MILL on the East Coast burned 105,227,000 gallons of fuel oil during the first three months of this year.

MAGNESIUM-THE KEY TO AIR POWER

American aircraft builders have, in an incredibly short time, created overwhelming air power through advanced design, flo-line production and the use of modern materials, among which magnesium is paramount.

The lowest of structural metals in specific gravity, yet possessing the highest strength-to-weight ratio, magnesium is truly the key to air power. At the Howard foundry, an ever-increasing tonnage of magnesium castings is being produced for America's planes and other armaments.

The remarkable properties of magnesium, including its easy machinability, which are proving their worth in war, will be equally valuable in many peace-time products, a trend in which Howard Foundry Company's output will figure prominently.

At the other two Howard foundries, aluminum and bronze castings are being poured into fighting equipment of many kinds. Combined, these three foundries provide the largest nonferrous jobbing castings production in America.

When you need nonferrous castings, call on Howard. For armament today—for utility tomorrow.

HOWARD FOUNDRY CO. 4900 Bloomingdale Road, Chicago







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pointed by OPA to serve on its Industry Advisory Committee for the Commercial Motor Vehicles Manufacturing Industry.

Those appointed include:

Truck Manufacturers

H. Morton Coale, vice-pres. and sales manager, The Auto Car Co., Ardmore, Pa.; Henry E. Hund, pres., Reo Motors, Inc., Lansing, Mich.; William E. Fish, commercial car manager, Chevrolet Motor Div., General Motors Corp., Detroit, Mich.; Leslie V. Brown, Mgr. Truck Div.,

Ford Motor Co., Dearborn, Mich.; George Pratt, director of sales, Hudson Motor Car Co., Detroit, Mich.; Robert W. Dibble, mgr. of domestic truck sales, International Harvester Co., Chicago; Albert C. Fetzer, vice-pres., Mack Mfg. Co., Long Island City, N. Y.; Earl J. Bush, vice-pres., Diamond T Motor Co., Chicago; George H. Strock, commercial car div., Dodge Division, Chrysler Corp., Detroit; Carl Loud, sales manager, Federal Motor Truck Co., Detroit; Richard G. Hudson, manager, commercial car division, Studebaker Corp., South Bend, Ind.; George Harold Bell, director of sales, Willys-Overland Motors, Inc., Toledo, Ohio.

Trailer Manufacturers

A. Kenneth Tice, general sales manager, Fruehauf Trailer Co., Detroit; Elbert J. Lucas, sales manager, Kingham Trailer Co., Louisville, Ky.; Marshall N. Terry, vice-pres., sales manager, Trailer Co. of America, Cincinnati.

Bus Manufacturers

Joseph P. Little, vice-pres., sales director, Yellow Truck & Coach Div., Pontiac, Mich.; Yale R. Shively, pres., Wayne Works, Richmond, Ind.; John N. Bauman, vice-pres., sales manager, White Motor Co., Cleveland.

Washington

• • • The War Production Board has announced the formation of the following industry Advisory Committees during the past week:

Power Driven Saw Blade Industry
Government presiding officer: William
C. Habbersett: Committee members are:
Harry G. Aldridge, Huther Bros. Saw
Mfg. Co., Inc., Rochester, N. Y.: Walter
H. Fowle. John L. Fowle Co., Woburn,
Mass.; H. J. Bradbury, Ohlen-Bishop
Mfg. Co., Columbus, Ohio: Walter C.
Hecker, Curtis Mfg. Co., St. Louis, Mo.;
Jacob S. Disston, Jr., Henry Disston &
Sons, Inc., Philadelphia; F. Somers Oldham Cocker Saw Co., Inc., Lockport, N.
Y.: G. W. Dunnington, E. C. Atkins &
Co., Indianapolis: Hal Redwine, Corley
Mfg. Co., Chattanooga, Tenn.; E. Foster,
R. Hoe & Co., Inc., New York; E. A.
Todd, Simonds Saw & Steel Co., Fitchburgh, Mass.

Automotive, Farm, and Tractor Liquid. Power Driven Saw Blade Industry

Automotive, Farm, and Tractor I Cooled Gasoline Engine Industry

Gooled Gasoline Engine Industry
Government presiding officer; R. L.
Vaniman; Committee members are; I. B.
Babcock, Yellow Truck & Coach Mfg. Co.,
Pontiac, Mich.; A. N. Morton, Mack
Mfg. Corp., Allentown, Pa.; B. B. Bachman, The Autocar Co., Ardmore, Pa.;
P. V. Moulder, International Harvester
Co., Chicago; Courtney Johnson, Stude-baker Corp., South Bend, Ind.; A. W.
Picket, Willys-Overland Motors, Inc., Toledo, Ohio; W. F. Kasper, Fairmont Railway Motors, Inc., Fairmont, Minn.; William A. Roberts, Allis-Chalmers Mfg.
Co., Milwaukee, Wis.

Tungsten Allocations

• • • The WPB revoked Conservation Order M-29-b relating to tungsten. The WPB explained that tungsten has been under allocation for such a long time that it is believed that stocks acquired without allocation are virtually non-existent. Therefore, hereafter, tungsten will be controlled by General Preference Order M-29 exclu-

Use of MRO Rating Defined For Leased Equipment Upkeep

Washington

• • • A person leasing equipment to others, which he agrees to maintain in good order, may use either his own or his customers' preference ratings and symbols to obtain repair and maintenance equipment, WPB ruled in issuing Amendment 3 to CMP Regulation 5.

The amendment also eliminates

PENNIES Save the Waste of

The loss in just a single shutdown is many times the difference in cost between a Schieren quality product and one of ordinary commercial standards.

CHAS. A. SCHIEREN COMPANY

36 FERRY STREET, NEW YORK 7, N. Y. 60 FRONT ST. W., TORONTO, CANADA



SCHIEREN LEATHER BELTINGS

are built to deliver ultimate power over a induslong trious life. The success of that policy is attested by our service to industry, the world over, through 75 years.

SCHIEREN'S MODERN DESIGN LEATHER V BELT

(Pat. Appl. for)



Any size belt can be made endless right on the job. Supplied in rolls-eliminates large inventory. The tenacious grip of the leather side walls makes it unnecessary to accurately match

SCHIEREN LEATHER PACKINGS



YOU CAN DEPEND ON A SCHIEREN PACKING TO PERFORM WELL-LONG!





R BELTINGS - SPECIALTIES

CHICAGO - SALT LAKE CITY LOWELL - DENVER - DALLAS NEW YORK - PITTSBURGH PHILADELPHIA NEWARK

DON'T DIVIDE MINE JAW CRUSHER SCREEN CRUSHER SCREEN CRUSHER WEIGHTOMETER SCREENS ROD MILL BOWL CLASSIFIER - OVERFLOW-HYDR. CLASSIFIER DORR THICKENER TABLES -CONCENTRATES-FILTER TAILINGS MIDDLINGS DEWATERING DRAG SINTER PLANT BINS ROD MILL PUG MILLS SINTERING MACHINE RAILROAD CARS

THE MODERN ore beneficiation plant is a highly complex arrangement of ore treating equipment integrated by plant design.

The McKee organization assumes responsibility for all phases of your project under a single contract.

To divide responsibility is to invite ineffi-

ciency in plant design and construction and improper correlation and installation of equipment, resulting in a plant which will not give you the best performance at the lowest cost.

McKee Undivided Responsibility assures you a plant of correct design to produce the best possible product at lowest operating cost.

Undivided Responsibility



in One Organization

Arthur G. McKee & Company

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man-; Elgham all

railer

direcntiac.

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Engineers and Contractors

COMMERCE BUILDING, 2300 CHESTER AVENUE · CLEVELAND, OHIO HOUSTON, TEXAS



War has found so many new uses for Stainless Steel and Stainless Steel Wire that the supply continues to grow more critical.

Even the Army and Navy listen to suggestions for alternatives. That indicates continued deferred deliveries.

However, if you formerly used Stainless Wire for peacetime production—or if Stainless Wire would contribute to products for which you plan—this period can prove to your advantage.

Production economies have been developed and much has been learned of the adaptability and working qualities of this corrosion-resisting steel.

PAGE has been right on top of this job. You can use that experience—and the availability of a wide range of standard shapes in PAGE STAINLESS WIRE—when your plans for after-the-war products are up for discussion.

PAGE Stainless Steel WIRE

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, New York, Pittsburgh, San Francisco

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.

List A from the regulation, inasmuch as this list is now contained in Priorities Regulation 3. The amendment points out that preference ratings assigned by it may not be used to obtain items appearing in List A or B of regulation 3.

Order L-298 Is Clarified

Washington

• • • Clarifying Order L-298, WPB's General Industrial Equipment Division says the order covers only welding equipment used for joining metals by the resistance welding process. Only one application form, WPB 2752, need be filed.

Railroad Axles Eased

Washington

• • • • WPB has removed restrictions on the manufacture of carbon steel axles and forgings in the higher tensile range for use for railroads and transit services. Changes in List 1 of Order L-211, Schedule 5 as amended, permit production of this grade of steel axles and forgings.

Applications Mailed to Operators Under Reg. 11-B

• • • Applications for priorities assistance to be used by persons who do not operate under the Controlled Materials Plan (Form WPB - 2613), for fourth quarter-1943 aid, have been mailed to companies operating under Priorities Regulation No. 11B as amended Aug. 28, the WPB announced last week.

This regulation and the form which is an application for aid in obtaining other than controlled materials, enable manufacturers who do not operate under CMP to consolidate their material requirements on one application

- 1. Production schedules may now be authorized as much as one year in advance. This relieves manufacturers not operating under CMP from filing regular quarterly applications for preference rating assistance.
- 2. If priority assistance is needed to purchase materials that are covered by a WPB order which requires that a special application be filed stating quantity grade, type, and size, such requests may be made on Form WPB-2613. This make it unnecessary to file the application specified in the order.
- 3. Persons using small amounts of controlled materials may no longer make application for such items on Form WPB 2613, as a result of an amendment of Priorities Regulation No. 11B.

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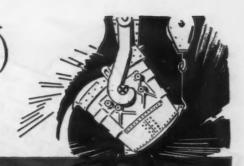
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PLAN THE DESULFURIZING OPERATION!

- 1 Desulfurize hot metal external to the blast furnace and steel plant.
- 2 Remove makeshift methods by creating an independent department between the blast furnace and steel plant.

External desulfurization merits study and planning and will lead to simplified handling!

blast furnace with consequent
benefits and at the same
time control sulfur!

SOLVAY Dustless Dense SODA ASH properly applied has a proven record as a satisfactory desulfurizer!



SOLVAY SALES CORPORATION

'Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 RECTOR STREET

NEW YORK, N. Y.

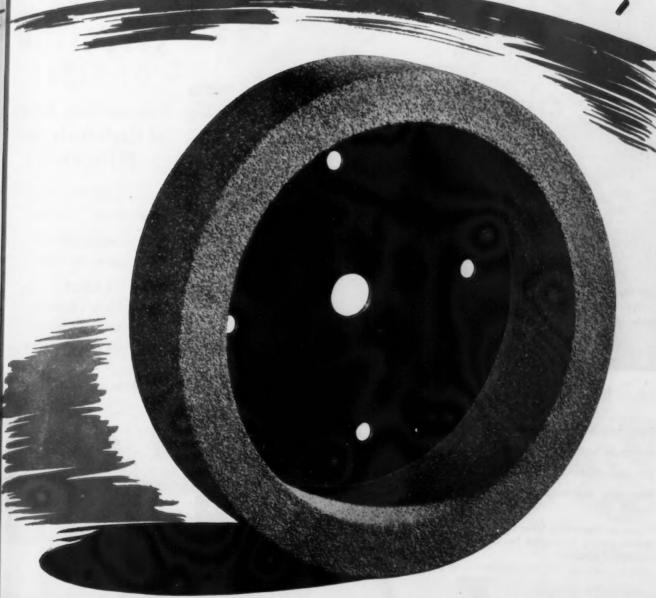


ELECTRO'S NEW GRINDING WHEEL

ELECTRO'S NEW GRINDING WHEEL

DEVELOPMENT REVOLUTIONIZES

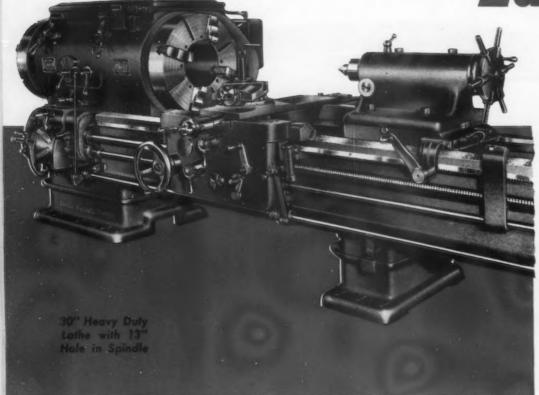
TUNGSTEN CARBIDE TOOL GRINDING



Manufacturers of Crucibles, Alloys, Stoppers, Refractories, Crinding Wheels

Speed War Production-Improve Work

HOLLOW SPINDLE



LARGE SELECTION OF SIZES

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Provide Wide Range mont of Usefulness and Efficiency

SMALL 18"-Up to 71/4" Hole

MEDIUM 24"-Up to 12" Hole

LARGE

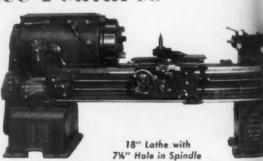
27"-Up to 13" Hole

30"-Up to 14" Hole

36"-Up to 161/2" Hole

Check these & Distinctive Features

- Easy, Fast, Simple Operation.
- Hydraulic Brakes and Clutches.
- Absence of Mechanical Troubles.
- Automatic and Ample Lubrica-
- Essential Operating Information Automatically Presented (on all Standard Models).
- Mechanism Protected by Automatic Control.
- Extraordinary Hardness of Bed.
- Available with Large Turrets for carriage which fully utilize the Great Power Capacity of these machines; and with Beds on both ends of Headstock.



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NEWS OF INDUSTRY -

War Needs for Electronic And Radar Equipment Mount

Washington

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. . Ray C. Ellis, director of the WPB Radio and Radar Division, has issued a warning that electronic equipment requirements in the war program are mounting steadily and hat the electronics industry faces a resh challenge in the form of higher production schedules proposed for the emainder of 1943.

The actual output of military elecronics equipment for July of this year gas \$234,000,000 and to meet future equirements the rate of production of electronics equipment will have to e stepped up to the rate of \$4,000,-000,000 annually between now and he end of December, 1943, Mr. Ellis said. This figure would jump the monthly dollar volume of production approximately \$333,000,000 a nonth, or nearly \$100,000,000 a Range month increase over the July total. As a further indication that no 'plateau" in production totals for lectronics is in prospect, Mr. Ellis stimated that war production needs o be supplied by the industry will e 30 to 40 per cent greater for 1944 han for this year.

Milestones



C. E. SELLSTROM and congratulations exchanged.

· · · The Sellstrom Mfg. Co. of Chicago recentlycelebrated its 20th anniversary at a simple noonday luncheon arranged for management and employees. Gifts were presented

The founding of the company took place in 1923. Its first home was a umble loft located over a garage on North Clark Street in Chicago. The usiness began under the name of Excel Sales Co. It boasted of only four employees, and these included G. A Peterson, now deceased and first president of the company, and G. E. Sellstrom, active head of the irm today. Now the company occules a large portion of a six story uilding where it manufactures and istributes, nationally, a complete ne of safety equipment.

70days Wickman PROFILE GRINDER



A Machine **Backed By** YEARS Of Intensive Use In Production

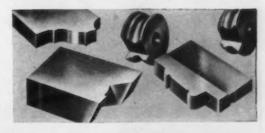
Two years ago, the Wickman Corporation of Detroit introduced to American industry a profile grinder incorporating a fifty to one pantograph for controlling the formation of the profile, and a 30-power microscope for observing development of the profile and for accurate inspection of the work before it is removed from the machine.

Even then, this machine was not a new development. Previously, our associate company, A. C. Wickman, Ltd., of Coventry, England, had many years background not only in the manufacture of the machine but also in its use and application.

After extensive use by a number of this country's best known manufacturers, the Wickman Profile Grinder has proved its exceptional efficiency and accuracy under widely varying production conditions.

The Answer To Your Difficult Contour Grinding Jobs

Profiles similar to these are being ground in tungsten-carbide and other hard metals on this machine without the use of a radius dresser or formed wheel. If you have any



unusual or particularly difficult grinding jobs of similar nature, you should become familiar with the possibilities of the Wickman Profile Grinder for use in your plant. We solicit your inquiries.

WICKMAN PROFILE



15537 WOODROW WILSON DETROIT, MICHIGAN



Only one unit to handle!

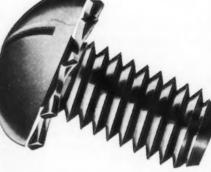
No time wasted putting lock washer on screw!

"Green" workers can't forget the lock washer!

Easy to drive ... locks tight!



Pre-assembled Shakeproof Lock Washer and Screw



DISTRIBUTOR OF SHAKEPROOF PRODUCTS MANUFACTURED BY ILLINOIS TOOL WORKS 2501 North Keeler Avenue, Chicago, Illinois

Manpower Cutting Canadian Output

for a general slowing down in produc-tion of base metals in Canada. Inter-national Nickel Co., has been forced • • Labor shortage is responsible 10 reduce output of nickel by 10 per cent in recent weeks owing to lack of manpower, officials state. An official release by the company says: "We are short at least 1,400 men at present. The reduction in output may run below the 10 per cent figure. The la-bor situation again is becoming criti-cal. Coupled with the high rate of absenteeism, it has been impossible to keep production at its former high level." According to figures supplied by the company, nickel matte production is down about 2,500,000 lb a month, and copper matte about 1,000,-000 tons a month. Officials say that employment at the big nickel produc-tion plant ran about 12,400 but this figure recently has been reduced by about 5 per cent.

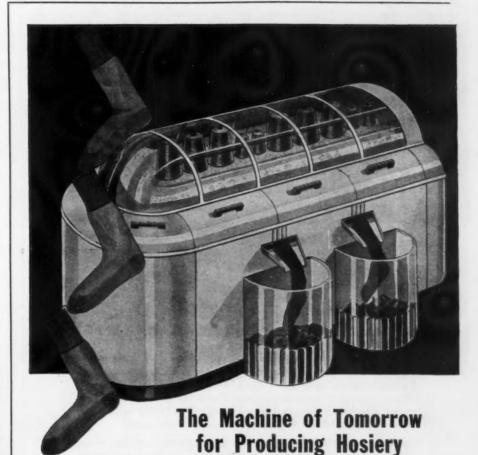
It is further announced that Canadian shipments of copper concentrate to the United States are running only about 60 per cent of the rate of last

The manpower shortage also is affecting various other base metal mining operation in this country. It is

NON-REFLECTING: A new method for taking out light reflections has been developed by H. R. Moulton, assistant research director, American Optical Co. He is shown with an oil painting, one-half of which is obscured by light reflections and the other half visible by treatment of the reflection remover.



said that Britannia M.ning & Smelting Co., Britannia Beach, B. C., which has mill capacity of approximately 7,000 tons has been forced to reduce production operations to about 50 per cent. Sherritt Gordon Mines in the Flin Flon section of Manitoba, is off about one third in production schedules, and Hudson Bay Mining & Smelting Co., in the same area, also is producing below its former peak. Other base metal mines, however, are in a somewhat better position and production cuts have been at a smaller rate largely due to the fact that they are drawing on stock piles or are withdrawing men from development work to direct production operations. Employment in Canadian base metal mines was reported at approximately 27,000 men, as at the end of June, compared with 28,500 in the first three months of the year. It is stated that there has been further loss in manpower since the June figures were re-



ready for the finishing room may not be as streamined as the illustration, but the hosiery knitting industry may reasonably look for great changes.

More accurate controls of tension and stitch, of moisture regain and of contamination-these are sure-likewise, the combination in a single machine of a sequence of operations now requiring separate units and the transfer tax of time.

Similarly, other machines, in many fields of industry, will pass new milestones of development. Some of these have advanced no farther than a rough sketch; some have emerged from the nebulous stage to the drawing board or to the stage where some practical link is all that is needed to convert an idea into a practical machine.

For such, solution may easily lie in the kind of experience and talent which, at FIDELITY, have developed a whole succession of ingenious and highly practical machines for different industries.

This experience and talent, together with the facilities for converting them into productive units, are described in an interesting book, "Facilities."

It will be sent on request to responsible executives.

Designers and Builders of Intricate, Automatic Precision Machines



32 YEARS' EXPERIENCE



Roebling Celebrates New Bridge Record

• • • Simultaneously with ceremonies in British Columbia, the John A. Roebling Sons' Co. celebrated, in Trenton, N. J., on Aug. 30, the opening of the Peace River Bridge in the new Alaskan highway. This vital link in America's most strategic highway was built by this company in the record time of 18 weeks after the setting of the first piece of steel and within seven and one half months after the signing of

the contract. This is approximately one-half the time previously required for the construction of a bridge of similar dimensions.

Major General Philip B. Fleming, U. S. Public Works Administrator, together with public officials and officers representing both the U. S. and Canadian armed forces were present and participated in the ceremonies dedicating this largest bridge in the

Crate Return Plan Pays Big Dividend

Dayton, Ohio

• • • The returnable aircraft engine and propeller crate program has turned out to be an outstanding example of the benefits to be derived from industry-government cooperation. A report from the Materiel Command at Wright Field here, initiators of the program, states that the program is saving 180-million feet of lumber per year at a saving of \$7,200,000 for the Army Air Forces.

Necessity for the plan may be seen in a demand for 50,000,-

Necessity for the plan may be seen in a demand for 50,000,-000 feet of plywood for crating purposes at AA-1 ratings now being received weekly—exactly double the mills' capacities.

80,000 tons of billets sheared in 864 hours!



This Coast Metals
hard-faced hot shear knife CAN TAKE IT!

INSTALLED in the tough bottom position, where it was continually subjected to shock and sprayed with water, it made 15 cuts every 2 minutes of $4\frac{1}{2}$ " x 9" x 36" stock,—for a total of 80,000 tons of billets! Thanks to its wear-resistant Coast Metals Hard-Facing, it stayed steadily on the job for 864 hours! Yet, in the same time, each of 4 upper blades was worn out in about 200 hours!

Coast Metals Hard-Facing protects equipment against wear, abrasion, shock, impact, heat! And lengthens its life several times! Think what this means in the way of reduced maintenance, fewer shut-downs, less idle labor, greater output!

Easily applied by arc or acetylene welding to surfaces, edges, points of *new* or *old* equipment parts of *any* ferrous metal. Write for new folder.

COAST METALS, INC.

Plant and General Offices: Canton, Ohio . Executive Offices: New York, N.Y.

COAST METALS hard-facing weld rods

path of the 1600 mile highway which forms a binding link between the two great North American nations. At the same time, officials of the Roebling Co. and distinguished guests gathered at the Stacey Trent hotel in Trenton to participate, in spirit, with those who were on the scene several thousand miles away.

The Peace River Bridge has a main span of 930 ft. and two side spans of 465 ft. each. Together with the approaches, the total length is 2130 ft. To build a structure of this size over a river frozen to a thickness of 4½ ft. and requiring the transportation of 100 freight car loads of material and equipment in this record breaking time was an accomplishment of which the Roebling company and the U. S. Public Roads Administration and the Army Engineers can well be proud

Precedent was broken in more ways than one in so doing The one hundred ton construction tower used in building the 190 ft. bridge towers was skidded across the river on the ice after the first bridge tower was erected, and in a hurry to anticipate the April 1 ice break-up deadline. Shacks had to be built for housing the workers and motor boats were built at the site for use after the break-up. As soon as the cables were spun, a gasoline pipeline was carried over on them to fuel the trucks which were scuttling to Alaska to feed our bombers and fighters.

The Roebling company has a record of which it may well be proud and which goes back for more than a century. And this, indeed, is one of the outstanding achievements of that long record of public service.



Blueprinting, Developing, Washing and Drying Machine . . . Speed 30 feet per minute.

PEASE SPECIAL FEATURES

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Pease Continuous

Model "22"

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- * Sliding "Vacuum-like Contact" smooths out tracings.
- * Three Speed Lamp Control operated at 10, 15 or 20 amperes avoids frequent dryer heat changes.
- * Actinic "No-Break" Arc Lamps cut arc breaks to once in 45 minutes and resume instantaneously.
- * Horizontal "Floating" Water Wash minimizes tensionprevents wrinkles.
- Quick Change Applicator System (illustrated and described above).
- * Eight-inch Drying Drums dry the paper "flat as hung wallpaper."

Quick change from ship to shore, in the Marine Corps ... Quick change from obsolete to current design, in the Engineering Department...Quick change from Blueprints to Negatives, in the Reproduction Department. No matter where changes are made, one point alone holds the spotlight - how quickly can they be made time lost for changes must be reduced to a minimum.

Engineering Departments depend on Pease Continuous Blueprinting Machines, because they are just that ... Continuous in operation on the production front, delivering quality Blueprints ready for use in one complete operation at a speed of 30 feet per minute with Model "22."

When Negative prints are required the "Quick Change" Chemical Applicator System, only one of many outstanding features, makes it possible to change over from Blueprints to Negatives, or vice versa in but 30 seconds. It is not even necessary to stop the machine.

THE C. F. PEASE COMPANY 2695 WEST IRVING PARK ROAD . CHICAGO

Blueprinting Machines INCLUDING DIRECT PROCESS PRINTING

Features of New WMC Plan Listed

Washington

• • • A series of questions and answers on the changes in the Selective Service rules was issued by the War Manpower Commission recently as follows:

What are the main purposes of the War Manpower Commission's recently announced plan for the utilization of manpower?

It is a plan to hold essential workers on war-useful jobs if that is where they are employed now, to assure the transfer of workers to jobs aiding in the war effort and to supply men needed for the armed forces without cutting war production.

What are the main features of the program?

There are four principal steps:

(1) Establishment of a list of critical occupations, covering skills urgently needed in the war effort. (2) Instruction to Selective Service Boards to give greater consideration than ever before to occupational deferment. (3) Establishment of new standards for permitting the transfer of civilian workers from job to job. (4) Extension of the list of non-deferrable activities and occupations providing that all men of military age must transfer from such jobs or be placed first in the list for induction by local boards.

What are the chances for occupational deferment of registrants whose jobs are included on the List of Essential Activities and Occupations but not on the List of Critical Occupations?

The basis for all occupational deferment is that the registrant must be a "necesary man" in war production or in support of the war effort. The decision in each individual case, subject to the right of appeal, is made by the registrant's local board. The List of "Critical Occupations," "Essential Activities and Occupations," and "Non-deferrable Activities and Occupations" are issued by the War Manpower Commission.

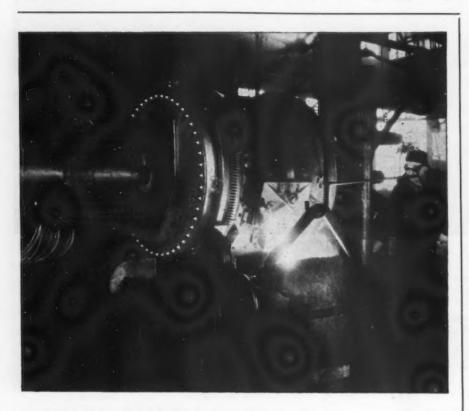
What is the status of registrants whose activities and occupations are not included on the "List of Essential Activities and Occupations" or on the "List of Nondeferrable Activities and Occupations"?

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The inclusion of a registrant's employment on the "List of Essential Activities and Occupations" or its omission from that list and the "List of Nondeferrable Activities and Occupations" does not conclusively determine his occupational status. The question to be determined by his local board, in consultation with the United States Employment Service and other national, state and local agencies, is whether or not the registrant is needed in his current occupation in support of the war effort. If the board so finds, when the registrant is called by his order number for possible induction into the armed forces, the board can defer him.

Is skill or replaceability the basis for occupational deferment?

Both factors are to be considered. A skilled workman is usually more difficult to replace than an unskilled one, but an unskilled worker may be deferred if his induction would vitally interfere with war production. The controlling factor is the immediate need. Local boards are instructed to take into account not only the national shortage in a registrant's skill, but



Detroit Furnaces BOOST PRODUCTION WITH LESS LABOR

Another well-known characteristic of a Detroit Rocking Electric Furnace is its high rate of production per man-hour. With a Detroit Electric you can produce as many as eight ferrous heats or sixteen nonferrous heats in one eight-hour shift. And you pour these heats with a minimum of dirt, fumes and hard work. Because of their clean operation, ease of control and automatic features, Detroit Furnaces give you precise metallurgical results. They can produce in quan-

tity (up to 4 tons per heat) any desired analysis.

For cleanliness and ease of operation, for precise metallurgical results—and for lower scrap losses, better all-around castings and greater production speed, it will pay you to operate Detroit Rocking Electric Furnaces.

Detroit ELECTRIC FURNACES

DETROIT ELECTRIC FURNACE DIV., KUHLMAN ELECTRIC CO., BAY CITY, MICH.

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THESE small commutators for aircraft radio Lesets were examined with a magnifying glass until the Westinghouse Electric & Manufacturing Company installed Jones & Lamson Optical Comparators for the inspection of these parts.

Now they are inspected rapidly, positively and with less fatigue. Moreover, production was in-

in Vital Airplane Parts are **ELIMINATED** by inspection with **Jones & Lamson Optical Comparators**

Courtesy Westinghouse Electric & Manufacturing Company

creased by 20 per cent.

Many other farsighted manufacturers have discovered the practical advantages of inspection by optical projection, after consulting Jones & Lamson inspection engineers. They are always ready to study your problems and make recommendations based on more than twenty years experience in this field.



Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Threading Dies

NES & LAMSON MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.
Profit-producing Machine Tools

also available replacements for even unskilled workers and current local shortages of skilled or unskilled workers in war supporting industries.

How long is a "necessary man" continued in occupational deferment?

Until he can be replaced by someone not qualified for military service. In the cases of men deferred in war production or activities supporting the war effort deferment cannot be granted for a period longer that 6 months at one time, and the deferment can be revoked at any time a registrant's local board finds that a registrant has left the job in which he was deferred or is no longer needed in it. On the other hand, the board can continue the deferment, by not more than 6-month periods, so long as in its judgment the registrant is needed in the war effort and is irreplaceable. Registrants deferred in agriculture, however, come under the Tyding's Amendment and are deferred for indefinite periods as long as they

are found necessary to and regularly engaged in an essential agricultura occupation or endeavor.

What is the status of registrants now engaged in nondeferrable activities or occupations?

Men of military age engaged in such activities and occupations, together with idlers, are given no consideration for dependency deferment except for unusual circumstances such as extreme hardship to depend ents. Otherwise, local boards are in structed to reclassify them immediate ately unless they transfer to other than nondeferrable occupations register for such transfer with th United States Employment Service in which event they will be given & days leeway prior to reclassification

How were the new standards de veloped and how will they be applied!

These standards are based on the best experience worked out by management and labor under the man local employment stabilization plan They will be incorporated in all stobilization plans by October 15. The regulation governing transfers ha been revised and in a new regulation (Regulation No. 7) broad powers an given local and regional officials of the War Manpower Commission to determine when a transfer is in the interest of the war effort.

Have employment stabilization plans been put into effect in the greater part of the country?

Yes. Such plans now blanket the country. They were established after consultation with regional or local representatives of management and labor.

Do these standards become effective immediately?

They will not become effective in any community until they have been acted upon locally by the WMC director who must consult with his management - labor committee before making the required changes.

What happens to existing employment stabilization programs?

They continue to apply until they are amended so as to conform with Regulation No. 7.

How will these amendments to employment stabilization programs change the rules that now apply to job transfers?

Very little in most areas. The provisions set forth in Regulation No. ? that must be included in all employment stabilization programs are largely based on rules already in opera-

Does the issuance of Regulation No. 7 mean that the War Manpower



PHILADELPHIA

San Francisco • Detroit

(Above) Moulding VIM Leather Packings under heat and pressure.



TO THE FOUNDERS of our Company who, seventy-five years ago, pioneered in bringing the manufacture of malleable iron to the midwest

TO ALL OTHERS whose efforts.. friendship.. and patronage have contributed to our Company's leadership in the malleable iron and steel castings industry

AND TO THE NATION in which it was possible to establish a record of seventy-five years of growth and continued success,

OUR THANKS AND GRATITUDE

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

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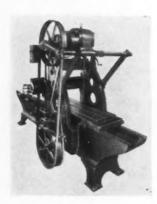
CLEVELAND

General Offices: Cleveland, Ohio

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MASTERDRIVES for PLANERS

Eliminates Lineshafting



Now you can have added flexibility in plant layout, because Masterdrive eliminates lineshafting and permits placing planers wherever you wish.

The drive is supported by four supports. Each of these require the drilling and tapping of four holes. Once supports and horizontal bars are in place, motor base and outboard bearing support can be moved laterally to line up with pulleys. Your present ceiling lineshaft pulleys are used on the motor countershaft.

A single complete installation with Masterdrive—one responsibility. Write today for details of planer or other Masterdrive applications.



Commission no longer relies on the initiative of local management and labor?

No. This regulation, establishing uniform standards, is necessary so that management and labor throughout the country may know the basic conditions under which job transfers are possible. Management and labor in specific localities must be consulted when existing programs are amended or new programs adopted.

How does one find out what rules apply to him?

All applicable rules will appear in the local employment stabilization program. If employers or workers have any questions, they should go to the nearest United States Employment Service office.

Will employers be required to hire workers sent to them by the United States Employment Service?

No. Employers are free to hire or reject workers referred to them by the United States Employment Service. But, if an employer rejects workers arbitrarily or if his hiring specifications are unreasonable, the supply of workers sent to him by the United States Employment Service may be cut off and his present work force permitted to leave. Measures like this will not be taken against an employer until he has had a chance to appeal and present his case.

Must a worker accept a job to which he is referred by the United States Employment Service?

No. However, workers who quit essential war work and workers who do not accept suitable jobs in which they best can help the war effort may, under certain circumstances, and for a limited period, be denied opportunity to work in less essential jobs.

What special restrictions apply with respect to workers in occupations in the new "List of Critical Occupations"?

When employment stabilization programs are amended to conform with Regulation No. 7, workers last employed in critical occupations may be hired only in jobs to which they are referred by the Employment Service. Likewise, no employer may hire a worker for a job in one of these occupations unless the worker has been referred to him by the Employment Service.

What can employers do to cooperate in the Employment Stabilization Program?

1. They should get in touch immediately with the nearest local office of the United States Employment Service and acquaint themselves with

the controls on hiring and recruitment.

2. They should make a conscientious and thorough effort to persuade workers who want to quit essential war jobs to stay on these jobs and should seek to remove the causes of wasteful labor turnover.

3. They should issue or deny Statements of Availability in accordance with the terms of the program.

4. They should hire and recruit workers only in accordance with the terms of the program.

How should workers cooperate in the Employment Stabilization Program?

1. Workers who are employed fulltime at their top skill in work which contributes to the war effort should stay on the job.

2. Workers who feel that they can contribute more effectively to the war by changing jobs should nevertheless stay on their present jobs until a decision as to their eligibility for a transfer has been made.

3. Don't shop for a job just to get more money.

If an employer hires a worker contrary to the provisions of the appliable Employment Stabilization Program, what penalties are there?

If an employer hires the worker at a wage higher than he received on his last job the employer is subject to criminal prosecution which may result in a fine of \$1,000, or a year in prison, or both. Furthermore, all wages paid by him to the worker may be disregarded when he computes his costs for income tax purposes, for price increase purposes or for government contracts. Furthermore, if he is violating the program, the Employment Service may issue Statements of Availability to all of his workers and may refuse to refer other workers to him

If an employer hires a worker in violation of the program but does not pay him a wage higher than he was getting on his last job, are there any penalties?

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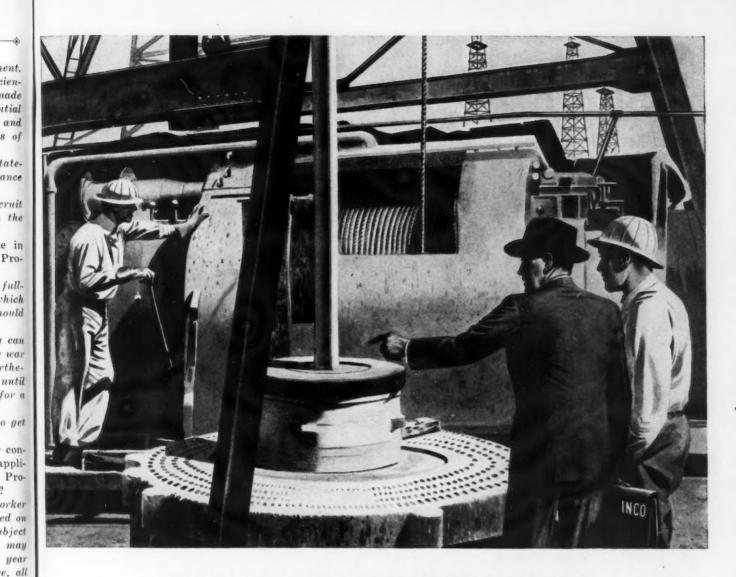
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All the penalties are available except the criminal penalties and the disregarding of wages paid in computation of costs.

If a worker accepts a job at a higher pay in violation of the Employment Stabilization Program are there any penalties?

Yes. He is subject to the same criminal penalties as is the employer who hired him. If he accepts any job in violation of the Program, whether or not at a higher rate of pay, he may lose that job and be unable to get another for 60 days.



to KEEP EM PRODUCING!

Oil is ammunition. On every battle front, oil is war material number one.

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ie may get anBesides power for ships and subs, planes and tanks, trucks and jeeps, it also provides the basic ingredients for synthetic rubber, toluene for TNT, chemicals, and many other essential war materials.

To meet increased wartime demands for oil, field and pipeline equipment carries heavier loads. Refineries make longer runs at high heats and pressures. Engineers add sub-zero cycles and new catalysts. Equipment is taxed up to and sometimes beyond rated capacity . . . precision equipment that cannot be readily replaced.

Despite emergency schedules, however, that equipment rarely fails. For, since the days when shallow wells were drilled with wooden rigs and kerosene was shipped in oak barrels, oil men have relied largely on stressed parts strengthened and toughened by additions of Nickel.

The oil industry knows many uses for Nickel alloyed materials, from crown blocks to drill bits, from sucker rods to pressure stills. Alone, or in combination with other alloying elements, Nickel helps metals resist corrosion, retard wear and absorb shock overloads. Properly used, a little Nickel goes a long way to insure dependable, uninterrupted operation of production and refining units.

For years the technical staff of International Nickel has been privileged to cooperate with petroleum engineers whose pooled information and "know-

how" are now so vital to Victory. To men in all industries who desire assistance in the selection, fabrication and heat treatment of ferrous and non-ferrous metals, INCO engineers and metallurgists offer counsel and data.

New Catalog Index

New Catalog C makes it easy for you to get Nickel literature. It gives you capsule synopses of booklets and bulletins on a wide variety of subjects—from industrial applications to metallurgical data and working instructions. Why not send for your copy of Catalog C today?





THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York 5, N. Y.

READ THIS

If You Have War Contracts
For Wood Or Wood Products!

One of America's largest fabricators of wood and wood products is anxious to acquire additional war contracts or sub-contracts. The Norwood Manufacturing Company, in peacetime the greatest volume producer in the industry, is particularly well fitted to execute large-scale orders with weekly or monthly repeating provisions.

Hundreds of skilled wood workers are employed right now by Norwood. Scores of modern machines are in operation on war contracts. However, Norwood's manpower and facilities are so great that a substantial amount of additional business can be handled promptly, efficiently and at low cost. Ample facilities for drying, machining, boring, assembling and finishing articles of wood or wood products.

Write, wire or 'phone Norwood today. If you care to send blue prints or samples of your products, Norwood will be pleased to quote you surprisingly low prices. Only bonafide war work, please, and only large-volume orders.

NORWOOD Manufacturing COMPANY

Fabricators of Wood Products

NORWOOD Cincinnati (12) Ohio

Aircraft Firm Makes Study of Employee Views on Many Questions

• • • One of the frankest examinations of employee opinion has been completed by the General Aircraft Corp., Astoria, Long Island, N. Y., bringing out the fact that 92 per cent of the workers would like to stay with the company after the war, and the fact that the employees feel the company's most serious problem is material shortages.

Results of the questionnaire were announced by H J. Maynard, Jr., president. Typical questions and the percentages of opinions were:

In your opinion what is the most serious problem this company and its employees must overcome to make the greatest possible contribution to victory?

				P.U
Shortage of	materials		*******	62
Absenteeism	*********			20
Inadequately	trained pers	onnel		10
Other				5

What do you think can accomplish most toward building "morale"—the will to work to win—among General Aircraft employees?

	U.
ombat stories of our glider in action	42
peeches by company or government offi- cials	or
osters in the plant urging greater effort.	
horter hours of work and additional	
conveniences	
ther	1

How do you feel about possible enemy attacks on this plant?

Our	defe	nses	wi	ll ke	ep i	them	aw	ау	 	676
		scare								
cha	ance	8							 	2
		com								
the	Br	itish							 	4

Do you think the majority of your fellow employees are:

						_	Per Cen	
						Yes	No	Don's
Competent						82	10	5
Sincere							17	
Doing their							16	14

There are all brands of foremen and supervisors. What do you think of yours?

		-Per Cen	t
	Yes	No	Don't Know
Does he "know his stuff"	74	18	8
Does he play favorites	28	60	12
Does he keep you busy	88	8	4
Does he keep promises Does he welcome sugges-	61	24	15
tions		20	13
Is he a good teacher	59	25	16
Does he "pass the buck".	25	60	15
**			

If you were hired within the past year, what is your opinion of the following? Were you

		Per Cen	
	es	No	Don't
	es	740	Know
Courteously treated in GAC			
employment office	97	3	
Is the personnel depart- ment (your service de-			
partment) aiding you	73	23	1
Placed on job for which		20	
best fitted	78	22	
Courteously treated by			
management	9.6	1.4	

Courteously treated by			
plant police	96	4	
Courteously treated by			
fellow employees	99		1
Assisted by miscellaneous			
company services	84	6	10

Concerning transportation and related problems:

Per Cent

. 140	res	
22	n t	Are you receiving enough gaso- line for necessary driving to and from work (keeping ir mind the various government regulations)
Don't	Per Cer	
Know	No	Yes
		Do your fellow employees
4	4	cooperate in ride-sharing 92
		In case it became desirable
		to again initiate a full
		night shift at GAC whereby production and
		bus transportation might
		be improved, would you
		be willing to work such
18	43	a shift 59

As indicated at the time your "merit review classification system" was installed, efforts have been made and will continue to be made wherein this system can be improved. However, in compliance with the President's wage freeze order, do you feel that all employees on the same type of job should receive a flat rate?

Yes			. 24%	No		76%
or	do	you	prefer	the	merit	review
sys	tem	1?				

									Per Cen	t
								Yes	No	Don't
Competent .			× 1	 				-	5	9
Sincere								89	7	4
Interested in	3	10	u		,			66	15	19

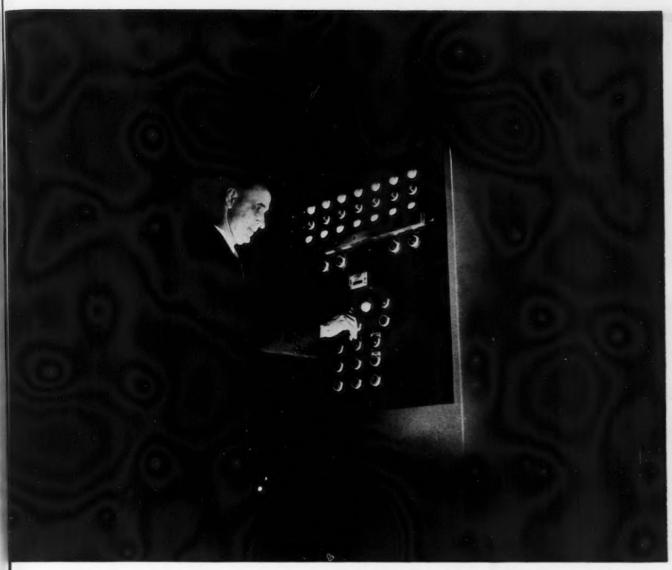
I want to know what you think the future holds in store for this company and its employees

P.	.C.
Expect to be laid off when the war ends.	4
Plan to quit and return to former busi-	
ness when the war ends	4
Hope GAC will still need my services	
after the war, but have some doubts	24
Expect GAC will need my services after	
the war, and intend to stay with the	
company	68

Gun Production to Be Cut

Toronto

• • • Otis-Fensom Elevator Co. Ltd., will reduce production of Bofor antiaircraft guns at its \$10,000,000 Hamilton plant as a result of the increasing trend from defensive to offensive operations on the major war fronts. Efforts to sustain employment will be made by obtaining orders for manufacture of parts. "As it becomes necessary to release employees, they will be transferred to the maximum possible extent to other essential industries," he added.



M. A. Weckerly, Director of Toledo Research, dreams of devices that out-super Superman. And a gratifying percent of his dreams come true! Buckeye-born, Purdue-educated, a 26-year Toledoman, his knowledge of weighing and force-measuring fundamentals is both profound and prolific.

RESEARCH made finger-flips fight

• The flip of a switch, the push of a button were once simple gestures of peace. Then Research put them to work for War.

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This deceptively peaceful control panel, for instance, monitors a great battery of weighing machines in their rapid and accurate batching of war chemicals and explosives. The fingers that flip these controls do indeed launch major offensives.

Toledo Research has worked, and is working, in many broad fields. Often the results may seem to be of little immediate importance. But the knowledge gained remains as in a reservoir to be drawn on when new problems shout for war-urgent answers.

The war service of Toledo electronic controls fully justifies the research which preceded their development. Their ready availability in these times of greatest need gives promise of what can and will be done by Toledo Research in anticipating problems of the post-war peace.

* * *

Toledo Dynamic "Electric Eye" Classifier . . . the principles of which were developed by Toledo Research more than 10 years ago...today weighs and sorts bullet-cores, at high speed, and to an accuracy of .2 of a grain.



TOLEDO SCALE COMPANY

Toledo, Ohio

Canadian Toledo Scale Co., Limited, Toronto, Ont.



Plants making shells or bombs often encounter trouble in getting good, uniform adherence of the protective paint or lacquer coat.

But many concerns have succeeded in overcoming this difficulty by MORE THOROUGH degreasing of shells, whether by machine or tank method, and THEN adding Oakite Compound No. 35, as directed, to the final rinse. Experience shows when this is done, spray coating of shells runs smoothly and firm adhesion of paint or lacquer is assured.

Full Details FREE!

The results secured by using Oakite Compound No. 35 to treat surfaces of all size shells, incendiary and depth bombs, cartridge clips, air field landing mats, tanks, etc. before painting are so outstanding that you, too, will want further information. Write TODAY and tell us what particular war product you are making . . . and our nearby Technical Representative will do the rest! No obligation, of course.

OAKITE PRODUCTS, INC. 30H Thames St., New York 6, N.Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada



Recent DPC Contract Awards

Washington

• • • Defense Plant Corp., RFC subsidiary, has authorized the following contracts:

Studebaker Corp., South Bend, Ind., to provide additional facilities at plants in Illinois and Indiana at a cost in excess of \$5,500.000, making a total commitment of more than \$93,000,000.

Fairchild Engine & Airplane Corp., Hagerstown, Md., to provide additional facilities at a plant in North Carolina at a cost in excess of \$115,000, making a total commitment of more than \$3,900,000.

General Motors Corp., Detroit, to provide additional equipment at plants in Indiana at a cost in excess of \$115,000, making a total commitment of more than \$1,000,000.

Rheem Mfg. Co., South Gate, Cal., to provide additional equipment at a plant in California at a cost in excess of \$100,000, making a total commitment of more than \$380,000.

Hytron Corp., Salem, Mass., to provide additional equipment at a plant in Massachusetts at a cost in excess of \$175,000, making a total commitment of more than \$330,000.

National Cylinder Gas Co., Chicago, to provide facilities at a plant in Indiana at a cost in excess of \$55,000.

American Radiator & Standard Sanitary Corp., Pittsburgh, to provide plant facilities in Illinois at a cost in excess of \$650,000.

Iron Fireman Mfg. Co., Cleveland, to provide additional equipment at a plant in Ohio at a cost in excess of \$80,000, making a total commitment of more than \$190,000.

National Aircraft Equipment Co., Los Angeles, to provide equipment at a plant in California at a cost in excess of \$40,000.

The Standard Tube Co., Detroit, to provide equipment at a plant in Michigan at a cost in excess of \$25,000.

Republic Steel Corp., Cleveland, to provide

additional plant facilities in Illinois at a cost in excess of \$1,245,000, making a total commitment of more than \$80,000,000.

Ex-Cell-O Corp., Detroit, to provide additional equipment at a plant in Michigan at a cost in excess of \$220,000, making a total commitment of more than \$8,425,000.

Joshua Hendy Iron Works, Sunnyvale, Cal., to provide additional facilities at a plant in California at a cost in excess of \$175,000, making a total commitment of more than \$4,300,000.

Packard Motor Car Co., Detroit, to provide additional equipment at a plant in Michigan at a cost in excess of \$1,500,000, making a total commitment of more than \$2,500,000.

Diamond Iron Works, Inc., Minneapolis, to provide additional equipment at a plant in Minnesota at a cost in excess of \$30,000, making a total commitment of more than \$150,000.

Foster Wheeler Corp., New York, to provide equipment at plants in Ohio and Pennsylvania at a cost in excess of \$45,000.

Cutter Laboratories, Inc., Berkeley, Cal., to provide plant facilities in California at a cost in excess of \$600,000.

Lombard Iron Works Co., Augusta, Ga., to provide additional equipment at a plant in Georgia at a cost in excess of \$60,000, making a total commitment of more than \$190,000.

Rheem Mfg. Co., South Gate, Cal., to provide equipment at a plant in California at a cost in excess of \$110,000.

Indianapolis Wirebound Box Co., Indianapolis, Ind., to provide equipment at a plant in Texas at a cost in excess of \$50,000.

American Aviation Corp., Jamestown, N. Y., to provide additional plant facilities in New York at a cost in excess of \$1,150,000, making a total commitment of more than \$1,240,000.

Rudy Furnace Co., Dowagiac, Mich., to provide equipment at a plant in Michigan at a cost in excess of \$65,000.

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Among the Week's Trade Notes

Buffalo Foundry & Machine Co., Buffalo, has bought the DOPP kettle manufacturing rights from the Sowers Mfg. Co.

Buffalo Tank Corp.'s sales, estimating and advertising departments will be located at 744 Broad Street, Newark 2, N. J.

Interchemical Corp. announces its new address at the Empire State Building, 350 Fifth Avenue, New York.

Mills Novelty Co., Chicago, will be changed to Mills Industries, Inc.

Metallizing Co. of America, Chicago, has purchased a new building at 135 Cedar Street, New York, as eastern headquarters for its sales and service operations.

Nelson's Scret Machine Products has moved its plant and executive office to West Street, Plantsville, Conn.

Wheelock, Lovejoy & Co., Inc., announces its new address at 12989 Greeley Avenue, Detroit 3.

Standard Sheet Metal Works, Fresno, Cal., has been taken over by the Rohr Aircraft Corp., Chula Vista, Cal., and is now known as the Fresno Division of that company.

Butler Machine Co., 1626 N. 12th Street, Milwaukee, has been organized by Peter, Leonard and Clarence Liebl to engage in a general machine shop business.

Northern Furniture Co., Sheboygan, Wis., is

investing \$750,000 to modernize its plant for plastic work and metal stamping after the war.

American Pattern & Mfg. Co., Racine, Wis., has purchased the plant and business of the National Aluminum Co.

Reltool Corp. has been organized at Milwaukee by Harold E. Flemming, Kenneth Van Es and Bruno Schultz to engage in general tool, die and machine work.

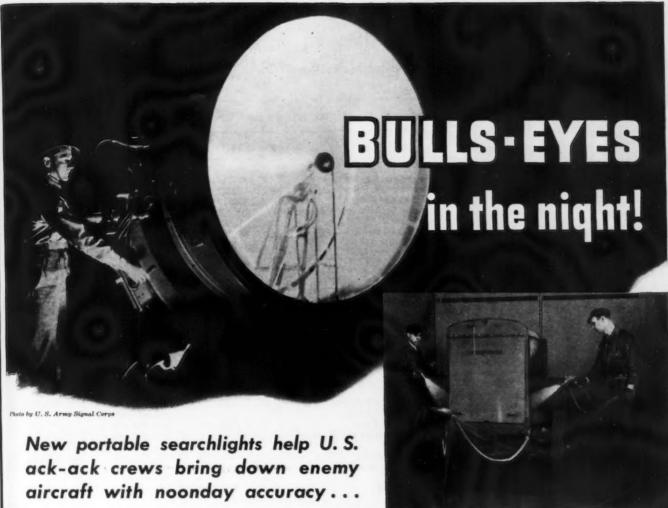
Thomas Machine Mfg. Co., Pittsburgh, has completed approximately \$200,000 worth of improvements. The work included installation of additional machine tools, handling facilities and buildings.

Industrial Abrasives, Inc., Chicago, have opened a new department to manufacture metal bonded diamond wheels.

Alvey-Ferguson Co. of California, Los Angeles, is a newly formed company for manufacturing and selling conveying equipment and metal products cleaning and finishing equipment similar to the Alvey-Ferguson Co., Cincinnati, John C. Walter is president and Charles R. Fleishman, vice-president.

RotaWings, Inc., New York, is a newly formed company devoted to the licensing and engineering for manufacturers of helicopters and accessories. Agnew E. Larsen and Joseph S. Pecker head the concern.

The Milwaukee Railroad has been authorized by the Federal court to proceed with the building of 300 50-ton automobile box cars to cost about \$900,000.



• Part of the credit for the amazing night-time marksmanship of our ack-ack gunners must go to the giant

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and trace their flight. With reflector and generator mounted on rubber-tired wheels, each of these big lights is not only portable but also adjustable to any position required. Indispensable to effective night defense, they have demonstrated their value in every theatre of war.

searchlights that enable them to spot enemy aircraft

And your Uncle Sam has lots of them! At General Electric Company men are working 'round the clock today producing these mammoth "night eyes" for our armed forces. Here again, in the race against time, modern DeVilbiss Spray Equipment is helping to "speed 'em through". The precious time saved by DeVilbiss spray guns in finishing operations means that each searchlight goes to war sooner!

You, too, can depend on DeVilbiss. Spray Systems for faster, more efficient painting or coating-no matter what the war product you are making. And tomorrow, when normal production replaces war production, you will find DeVilbiss ready with better-than-ever spray equipment to satisfy your new requirements, however exacting they may be.

THE DEVILBISS COMPANY . TOLEDO, OHIO Canadian Plant: WINDSOR, ONTARIO



PROUD to have won the coverea Army-Navy "E" for excellence in war production, the men and women of DeVilbiss pledge to continue giving their all-out best-for Victory.

SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS

DOORS THAT SAVE SPACE, TIME and METAL

WOOD ROLLING DOORS

In spite of wartime limitations, you can get efficient, space-

saving doors with coiling upward action
—Kinnear WOOD Rolling Doors. Their
durability and service have been thoroughly proved on numerous installations
for many years!

Constructed of strong, inter-lapped wood slats, they coil out of the way above the opening, remain out of reach of damage, and require no usable floor, wall or ceiling space for either storage or operation. They offer a high degree of protection, and block out wind and weather. The illustrations show how the rugged curtain is assembled, and how it permits the door to flex without binding. Kinnear Wood Rolling Doors are available in any size, with motor, manual or mechanical operation. Write for complete details! THE KINNEAR MFG. COMPANY, 1760-80 Fields Avenue, Columbus 16, Ohio.

Offices and Agents in Principal Cities



Lend-Lease in the Theaters of War

• • • Below are tables showing distribution of Lend-Lease material to the various theaters of war for periods ending June 30, 1943.

	1941	1942	JanJune 1943
Ordnance and Ammunition	\$33,267,000	\$173,619,000	\$144,163,000
Aircraft and Parts	2,022,000	114,283,000	133,002,000
Tanks and Parts	30,573,000	48,408,000	125,362,000
Motor Vehicles and Parts	10,758,000	116,289,000	55,659,000
Watercraft	1,820,000	10,794,000	4,530,000
Industrial Items	14,683,000	194,138,000	88,702,000
Foodstuffs, etc.	2.792.000	34,423,000	23,666,000

- '	U. S. S. R.		
	1941	1942	JanJune 1943
Ordnance and Ammunition	\$75,000	\$213,918,000 300,641,000	\$102,279,000 220,577,000
Motor Vehicles and Parts	35,000	176,804,000 149,092,000	6,504,000 166,824,000
Watercraft Industrial Items Foodstuffs, etc.	435,000	11,020,000 312,881,000 184,814,000	44,886,000 321,825,000 230,997,000
TOTAL	\$545,000	\$1,349,170,000	\$1,093,892,000

	United Kingdo	m		
	1941	1942	JanJune 1943	
Ordnance and Ammunition Aircraft and Parts Tanks and Parts Motor Vehicles and Parts Watercraft Industrial Items Foodstuffs, etc.	\$30,761,000 13,330,000 10,521,000 14,558,000 6,003,000 165,357,000 332,090,000	\$250,400,000 267,762,000 35,998,000 61,950,000 45,906,000 604,218,000 731,094,000	\$284,806,000 225,719,000 322,360,000 66,946,000 73,011,000 448,574,000 466,535,000	
TOTAL	\$572,620,000	\$1,997,328,000	\$1,887,951,000	

		1	
	1941	1942	JanJune 1943
Ordnance and Ammunition	\$9,560,000	\$165,106,000	\$91,183,000
Aircraft and Parts	7,995,000 1,934,000	96,779,000 100,264,000	91,370,000 24,296,000
Motor Vehicles and Parts	17,856,000	75,028,000	54,298,000
Watercraft	68,000 11,523,000	2,849,000 170,156,000	9,154,000 154,239,000
Foodstuffs, etc.	3,282,000	30,529,000	15,470,000
TOTAL	\$52,218,000	\$640,711,000	\$440,010,000



Steel Casting Time Lag Modified

Washington

• • The time requirement for placement of orders for steel castings under CMP Regulation 1 has been modified. WPB pointed out last Thursday in announcing Amendment 3 to that regulation.

The amendment lengthens the time interval which must be allowed between the placement of the order for steel castings and the first day of the month in which delivery is requested. In addition, it distinguishes between carbon and alloy steel castings, allowing a greater time lapse in the case of the latter. The new order placement requirements, according to WPB officials, will be more adaptable to foundry operation in connection with casting production.

The following table indicates the new time period by days which must elapse in the case of both carbon and alloy steel castings, as compared with the old period: (See below.)

This action was taken through amendment to Schedule III of CMP Regulation 1. At the same time, it is pointed out by the amendment that patterns are considered to be available for castings only after they have been received at the foundry, checked, rigged for production, and sample castings have been approved.

The amendment also provides for establishment of minimum mill runs for castings. Minimum runs may be established by each individual foundry, but in no case shall any minimum mill quantity be more than 5 net tons.

Reusable Pipe Services Given Maximum Prices

Washington

• • • Sellers of reusable iron and steel pipe have been given specific maximum prices they may charge for performing two extra services on pipe reconditioned for re-sale, the OPA announced.

The new maximum charge established for joint welding is 11c. per lineal inch of circumference for standard weight pipe and heavier, and 10c. per lineal inch of circumference for lighter than standard weight pipe.

For prime coating, the new maximum charge is established as \$7.50 per net ton of the weight of the pipe after prime coating.

The extras are established in Amendment No. 1 to Revised Maximum Price Regulation No. 230 and are effective Sept. 4.

Warehouse Sold Forgings Classed Controlled Materials

Washington

• • • Steel forgings sold by a warehouse are controlled materials, regardless of whether they were produced by a steel producer or by a forging shop, WPB pointed out last Thursday in announcing Direction 25 to CMP Regulation 1. As a result of Direction 25, warehouse orders for forging, whether placed with a steel producer or a forger, must be accompanied by Form WPB-2333. Forgers who receive such warehouse orders may place purchase orders for steel required to fill them or to replace inventory used to fill them, by the same procedure. However, in such cases, the forgers' orders must b identified by the symbol "WH."





COMING EVENTS

Sept. 28 to 30-Iron and Steel Engineers convention, Pittsburgh.
Oct. 5, 6—Gray Iron Founders' Society, Cincinnati.
Oct. 5, 6, 7—National Safety Congress, Chicago.

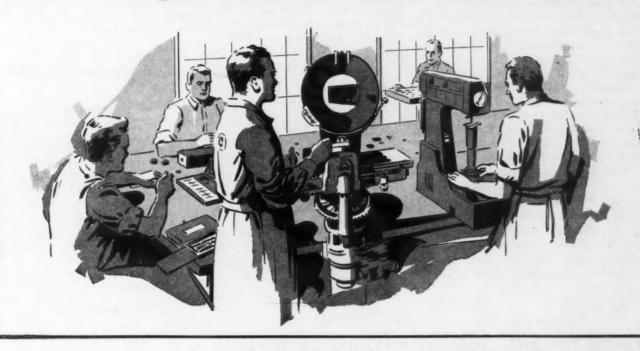
Oct. 11, 12-American Society of

Tool Engineers, Indianapolis.
Oct. 13 to 16—The Electrochemical Society, Inc., New York.

Oct. 14, 15—American Machine Tool
Distributors' Association, Montebello, P. Q., Canada.
Oct. 18 to 22—National Metal Con-

gress and Exposition, Chicago. Nov. 10, 11—Industrial Hygiene Foundation, Pittsburgh.

IS One Part TOO VULNERABLE ON YOUR INSPECTION LINE?



S there one part in your product so difficult to produce in your own plant, or so hard to have made right, that it becomes abnormally vulnerable to rejections on your inspection line?

Do such vulnerable parts fail to arrive on time . . . cause costly gaps in assembly lines, waste of manpower, loss in war effort?

Contact KAYDON

CAPACITY **Immediately** AVAILABLE for ball and roller BEARINGS Size 6" to 60"

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The making of difficult parts, with precision, speed and economy considered practically "impossible" two or three years ago, is now routine Kaydon procedure . . . because Kaydon is equipped with engineering plus production experience and facilities to assure "on time" deliveries of precision metal parts.

KAYDON



NGINEERING

MUSKEGON 81. MICH. MeCRACKEN STREET

Specialists in Difficult Manufacturing

WPB-2613 Issued; Applies to Schedules

Washington

• • To be used to make application for an authorized production schedule and a preference rating for the purchase of materials to meet that schedule, copies of Form WPB-2613 (formerly PD-870) have been mailed to consumers. The application is for materials to be ordered in the fourth quarter of 1943 and the subsequent three calendar quarters. Also sent out was a copy of Priorities Regulation No. 11-B as recently amended.

Refiling on this application form is necessary even if an authorized production schedule for the fourth quarter of 1943 has been received. It will, not be necessary, however, to file a regular quarterly application hereafter provided consumers have been authorized a production schedule on

WPB-2613 to meet production needs for subsequent quarters.

Attention was directed to the following significant changes which have been made in the form and in Priorities Regulation No. 11-B.

"In Section D of the form you are required to list all production materials for

quired to list all production materials for which a preference rating is needed. You may not extend ratings received on this application for materials that are not listed in Section D.

"If priority assistance is needed for materials that are covered by a WPB order which stipulates that a special application must be filed stating quantity, grade, type, size, etc. You may apply on Form WPB-2613 for that material, stating quantity, grade, type and size. It will then not be necessary for you to file again on the application specified in the order.

order.
"Priorities Regulation 11-B has been amended so that small users of controlled materials may not use this application

Consumers told consumers were told not to request materials on this application for which a preference rating has been assigned automatically under an existing WPB order. Examples of such orders which were cited are M-317, M-208 and P-140. the substitution of April 1, 1943, specifications as to approved sizes and shapes for the earlier ones of May 11. 1942. Also, a new paragraph was added to provide for delivery of stock shapes when orders contain no definite specifications.

Delayed Shipments Clarified

Washington

• • • Steel producers have been notified by WPB that permission to make shipments on orders placed against allotment numbers after the delivery date promised applies equally to other types of orders against allocations, such as warehouse orders, MRO orders, etc. Direction No. 18 to CMP Regulation No. 1, states that any authorized controlled material order which cannot be shipped within the month for which accepted, should be shipped as soon as possible thereafter, notwithstanding the fact that the allotment furnished with such order may have called for delivery within a preceding quarter.

This applies equally to all authorized controlled material orders, including warehouse orders, MRO, or other authorized controlled material orders which bear no specific allotment numbers. For example, a warehouse order, bearing the certification required in CMPL-85, was accepted for delivery during the month of June, 1943, but for some reason the producer was unable to make shipment by June 30. Under the terms of Direction 18, this order should be scheduled and shipped at the earliest possible date although the certification provided with the order applied only to deliveries authorized in the second quarter.

Forms for SRC Sales Are Issued by WPB

• • • WPB has sent out forms advising prospective buyers of methods of making purchases of certain forms of steel which have been with the Steel Recovery Corp., which may be made without reference to preference rating and without being charged against CMP allotments.

Sales will be made on authorization of either WPB office, at SRC or the regional WPB office of the region in which the steel is located, as follows:

A sale to any consumer for any use

permitted under WPB limitation or conervation orders.

A sale to a warehouse or dealer within the limits permitted by General Preferthe limits permitted by General Pence Orders M-21-b-1 and M-21-b-2.

A sale in connection with any program which has been approved by the Steel Division and the appropriate industry division or divisions and which is otherwise permitted by limitation or conservan orders. This authorization can only given by WPB office at SRC.

Application for authorization may be made by buyer or seller, in person, in writing or by telephone. Data required are: names and addresses of buyers and sellers; buyer's CMP symbol and number, if any (for program identification only); if none a statement of proposed usage, no priority being required; lot number on seller's report form filed with SRC and SRC stock code number.

Priority Changes

L-38—Amendment 2 extends deliveries of mechanical drinking water coolers to hospitals, new or enlarged industrial plants or as replacements in plants where existing coolers are beyond repair.

L-208—Amendment 1 provides that "operation" applied to gold mines means any work in and about a mining enterprise, including prospecting, exploration and development work. It also provides for the transfer of Schedule A from PRP-56, and that machinery of closed mines cannot be disposed of without WPB approval except to producers who hold serial numbers issued under P-56, P-58 and P-73.

P-98-c—Provides preference rating for use a in purchasing repair and maintenance parts of petroleum equipment owned or rented by business firms.

L-211—Amendment provides that bar sizes and special sections will not be governed by the wartime limitations imposed by WPB on the shapes and sizes of structural steel that the mills may roll.

Bar Size Shapes Removed From Structural Definition

Washington

• • • Shapes under 3-in, have been removed from the definition of "structural steel shapes" by an amendment to Schedule 4 of L-211, announced last Thursday by WPB, because they are considered "bar size" shapes. They are no longer part of the schedule. Neither does the schedule cover socalled "special sections."

Another change in the schedule is

Additional **CMP** Developments

Amendment 3 to Reg. 1 extends the time with which orders for steel castings must be made prior to their deliveries.

• Direction 25 to Reg. 1 rules that steel forgings are considered controlled material when sold by a steel producer and by a distributor, regardless of who produced the forgings. They are considered Class A products when sold by a forger who is not a steel producer.

Direction 18 to Reg. 1 permitting steel producers to make shipments on orders placed against allotment numbers after delivery date promised, applies equally to other types of orders against allocations, such as warchouse orders, etc.

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REPUTATIONS GO ON ... In the busy post-war era of the future, the new precision standards established in war production will be adopted to peacetime products ... making new and better products ... at lower production costs ... for longer

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service. WESSON Carbide Cutting Tools will go on into the "new action" in industry and help advance "the more abundant life." To this end WESSON is devoting broad research and cooperation with forward-looking metal-working manufacturers.

Six Companies Get Maritime Contracts

Washington

• • • • The Maritime Commission announced on Monday that contracts for the construction of 86 new type small cargo vessels to be known as C1-M-AV1'S have been awarded to six companies located on the Great Lakes and the West Coast.

Designed for transoceanic service, the new vessels will be approximately 4000 deadweight tons. The new ships which are 320 ft. long, are diesel propelled, and will be slightly faster than the Liberty ship.

At the same time, Maritime announced that contracts have been let for 70 additional vessels, including six C-type and 64 special type.

The new small type cargo vessels are expected to be delivered in 1944, as are all of the new ships with the exception of 29 of the special type ships.

CMP Forbids Retroactive Authorizations to Purchase

• • • Purchasers who place orders for controlled materials in excess of the allotments or quotas will be referred to the Compliance Division of CMP and appropriate action taken. WPB has given the various claimant agencies notice that they must forbid all retroactive authorizations covering such over-orders. This ruling has been made in CMP Bulletin No. 34 (revised).

A.S.&W. Announces Sale Of Old Consolidated Works

Cleveland

• • • • The sale of the 54-year-old properties of the Consolidated works of American Steel & Wire Co. was announced last week. John W. Galbreath, well known Columbus real estate operator who figured in such other large scale sales as the Cement City housing developing at Donora, Pa.; Morgan Park housing development at Duluth, Minn.; and U. S. Steel MacDonald, Pa., housing properties; purchased the Consolidated holdings.

A portion of the property purchased by Mr. Galbreath will be leased by American Steel & Wire Co. to continue partial production of a few specialty wire items, and employees of the company affected by the deal will be transferred to other plants.

Basic Magnesium, Inc., At Full Capacity

Las Vegas, Nev.

• • • Exactly 11 months after power was turned on in the first unit of the plant Basic Magnesium, Inc., Las Vegas, Nev., is operating at full capacity. At the beginning of the month all cells but 12 were operating at one time. Because of necessary shutdown for maintenance and repairs, this record is not expected to be repeated.

Bethlehem Marks Up Tonnage Record in August

• • • E. G. Grace, president, Bethlehem Steel Co., announced last week that Bethlehem made its all-time monthly production record with an August output of 1,118,544 tons of steel ingots.

The Bethlehem Steel total for August was up 32,302 tons over July and the former record made last March by 4981 tons. The increase was characterized by Mr. Grace as "an outstanding example of the way employees and management are working together.

WPB Grants Premium Fluorspar to Electric Furnaces

Washington

• • • John T. Whiting, director of the WPB Steel Division, has certified permission for all electric furnace steel producers to purchase premium grade fluorspar as covered in Section 3, OPA Order RMPR-126, dated July 1. Any other steel producers who require premium grade fluorspar must present the complete detailed technical data to the director of the Steel Division for consideration.

Price Briefs

- Amendment 6 to Reg. No. 133 adds several more items including hay loaders, side delivery rakes and manure spreaders to the used farm equipment items under specific price control.
- Supplementary Order No. 52 provides that charges for repairs to freight and passenger cars made during the interchange of traffic by one railroad on cars owned by another are removed from price control.
- Amendment No. 1 to Order 19 of RPS 41 permits buyers and sellers to adjust prices on railroad locomotive and tender steel castings to a maximum that may be fixed at the date of delivery by action of OPA, effective prior to October 1.

Eastern Basing for Manganese Ore Sales

Washington

• • • Manganese ore sellers were authorized by OPA on Tuesday to use Atlantic basing points in sales calling for delivery in the area east of the Mississippi River and north of the Ohio River.

Previously the basing point provision of MPR No. 248 required sales to some points in this area to be made on Gulf basing points which was contrary to previous trade practice. The order was amended to eliminate the unintended effect of the basing point provision of the regulation as originally issued. OPA said the sales affected by the basing point change would be of very small volume.

Machine Tool Demands Show Downward Movement

Cincinnati

· · Recapitulation of business by machine tool manufacturers during the month of August indicates very definitely that the machine tool demand is downward. In one or two instances, it was indicated that present ordering is about 35 per cent of present shipments, although all plants are running three shifts and anticipate this for the rest of the year to clean up their backlogs. In discussing backlogs, manufacturers indicated that the cancellation rate which showed some acceleration two or three months ago, has now dwindled. While manufacturers do not expect ordering to reach full proportions of a year ago, there is still a considerable feeling in the area that with changes in war needs, continued flow of orders for new machine tools is expected. A second factor, that they anticipate will sustain at least a reasonable demand is the fact that with the present high pressure for production, tools will wear out at a higher rate than during normal conditions. Some manufacturers indicate that a few customers are talking about post-war business, and in a few instances, desire to place orders but were stopped because of present government priorities. Of course, the headache over pool orders continues to be discussed but no definite reactions or opinions seem to be forthcoming.



BIGGEST NEWS IN AC WELDING!



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priover assed Heavy Duty Industrial Models (shown above) are offered in capacities from 50 to 1200 amperes. Intermittent Duty Models range from 20 to 335 amperes capacity.

If your need for welding equipment is urgent, immediate deliveries can be made on proper priority. See your nearest P&H representative; write or wire us.



Engineered for modern production work, the new P&H AC welders provide a continuous concentrated arc which makes it easy to control the molten pool of weld metal. They simplify intricate, close-corner welding, enabling you to save time and reduce welding costs.

The complete line includes a wide range of capacities of both Heavy-Duty and Intermittent-Duty Industrial Models. All carry the WSR (Welding Service Range) ratings which certify the usable welding current of each machine on the basis of actual delivered output from minimum to maximum capacity. Early deliveries are possible for essential industries. Write for literature.

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PERSONALS

- . J. R. Gregory has been elected vice-president in charge of sales of the new Geneva Steel Co., Geneva, Utah, U. S. Steel subsidiary. Mr. Gregory, who has been associated with U. S. Steel for 25 years, was formerly vice-president and general manager of sales for Columbia Steel Co., Pacific Coast subsidiary of U.S. Steel. J. E. Butler was named comptroller of the new Geneva company. He has been associated with Columbia Steel for a number of years, and was most recently in charge of accounting on the Geneva Works construction project. J. Wohlwend, former assistant treasurer of Columbia Steel Co., was elected treasurer of the Geneva Steel Co. Merrill Russell, a member of the law firm of Knapp, Cushing, Hershberger & Stevenson. division counsel for U.S. Steel, was made secretary and general attorney. Other officers of the new company include Walther Mathesius, president. and F. B. DeLong, vice-president and general manager of sales. (See IRON AGE, Sept. 9, 1943, pages 80 and 94.)
- •A. C. Evans was promoted to chief engineer of the road machinery division. I. C. Moreau was assigned the duties of chief engineer of the hoist and body division. J. E. Monahan was placed in charge of all hydraulic engineering.
- John D. McGillis has been appointed salvage director for WPB in Michigan, succeeding P. H. Sheridan, who returns to his own business. Mr. McGillis was formerly with Burroughs Adding Machine Co.
- A. C. Ryan has been named deputy director of the production service division of WPB in the Detroit region.
- William M. Stabler has been appointed service manager of American Propeller Corp., Toledo, subsidiary of Aviation Corp. He joined the Lycoming division of the Aviation Corp. at Williamsport, Pa., in 1928 and was special service representative for that division for a period of five years. Prior to that he was supervisor of experimental departments and helped build and test Lycoming's first aircraft engine.
- T. H. McSheehy has been made sales manager, Wire Rope Division, Wickwire Spencer Steel Co.



J. R. GREGORY, vice-president in charge of sales, Geneva Steel Co., Geneva, Utah, U. S. Steel subsidiary.



J. E. BUTLER, comptroller of Geneva Steel Co., Geneva, Utah, U. S. Steel subsidiary.

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• J. A. Old, who has been with the company a number of years, succeeds Mr. McSheehy as Pacific Coast sales manager.

Mr. McSheehy first came with Wickwire Spencer in 1923, and has served in a variety of executive sales capacities, including hardware products manager, structural products manager, Chicago district manager and Pacific Coast manager, which position he held at the time of his new appointment.

 Clayton S. Shoemaker has been appointed Eastern sales manager for the Dow Chemical Co., Midland, Mich.



CLAYTON S. SHOEMAKER, new Eastern sales manager of the Dow Chemical Co., Midland, Mich.

Mr. Shoemaker has been associated with the Dow Company for several years, and has held various sales executive positions. Frederick A. Koch, former assistant manager of the New York sales office, was named assistant Eastern sales manager. Alexander Leith, Jr., was made manager of the Philadelphia office and Alfred A. Lawrence manager of the Boston office. Mr. Shoemaker and Mr. Koch will make their headquarters at 30 Rockefeller Plaza, New York.

- Clarence C. Helmle has joined the technical staff of the Enthone Co., New Haven, Conn., as a chemical engineer. He was formerly with the General Electric Co.'s Bridgeport Works, where he was successively plating analyst, chemist and finally head of the inorganic laboratory in charge of electroplating, metallurgy and general chemistry.
- · Alexander Kennedy, Jr., has been appointed assistant to the manager in charge of engineering and Howard P. Bish as assistant to the manager in charge of administrative affairs of the Federal and Marine Divisions, General Electric Co. Mr. Kennedy joined GE shortly after World War I as a member of the Induction Motor Engineering department. For the past 10 years he has been application engineer on main propulsion turbines for the Marine department. Mr. Bish was formerly manager of sales of the Navy ship section of the Federal and Marine department.
- I. Frank Brownson, regional coordinator of the Westinghouse Elec-



J. WOHLWEND, treasurer of Geneva Steel Co., Geneva, Utah, U. S. Steel subsidiary.

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tric Appliance Division, has been appointed manager of the division's laundry equipment department. He was associated with the Canadian Westinghouse Co. from 1933 to 1940, serving as field manager for the distribution of electrical appliances and radios. Three years ago he joined the sales department of the Westinghouse plant in Mansfield, Ohio.

• Howard E. Stoll, for 31 years manager of sales, rails and accessories, Bethlehem Steel Co., retired from active service on August 31. He was succeeded by John W. Murphy, acting manager of the department. Prior to his employment by Bethlehem Mr. Stoll was inspector of materials in the

P. S. JONES, general sales manager of Cutler-Hammer, Inc., Milwaukee.

engineering department of Pennsylvania Railroad. He has been with Bethlehem since 1923, having served in the Boston office and as assistant manager of sales in the Baltimore office.

- William D. Kennedy, vice-president of the Wright Aeronautical Corp., was made manager of the Lockland, Ohio, plant. W. W. Finlay, his predecessor, was appointed to the post of industrial relations and personnel department activities for the entire corporation.
- Arch H. Copeland and John Berdan have been appointed assistant directors of sales of the Diamond Alkali Co. Mr. Copeland has been affiliated with the company and its subsidiary companies as an executive assistant for a number of years. Mr. Berdan has been associated with the company since 1931. J. D. Mattern has been made manager of alkalisales. Mr. Mattern has been a member of the Diamond Alkali sales staff since 1922.
- Richard W. Murray has been appointed brush engineering representative for the Connecticut and Rhode Island territory of the Osborn Mfg. Co., Cleveland.

Mr. Murray takes the place of James G. Gammel, who has been transferred to Osborn's Cleveland home office where he will assist in the intensified brush engineering analysis program being conducted by the company.

- William Heidgerd has been appointed district sales manager for the Follansbee Steel Corp., Michigan area. He was previously director of purchases for the Parsons Co., Traverse City, Mich., and prior to that time had been associated with the Jones & Laughlin Steel Corp.
- P. S. Jones has been made general sales manager for Cutler-Hammer, Inc., Milwaukee. Mr. Jones joined the company at Milwaukee as a sales engineer in 1915. Four years later he was transferred to the Pittsburgh office, where he was later appointed branch manager. Prior to his new appointment he was in charge of the New York sales territory.
- E. C. Morse, former president of the Chrysler Export Corp., has been appointed economic advisor to the International Economic Council, Washington.
- C. P. Varney has been made executive representative of the Rock Island Railroad in the Minnesota and Northwest area. Mr. Varney, who will

have his headquarters in Minneapolis, comes to Minnesota from Washington, where he has been the road's executive representative since August, 1942.

- Paul Pigott, president of Pacific Car & Foundry Co., Seattle, has been elected a director of the Standard Oil Co. of California.
- K. C. Gardner, vice-president and general manager of United Engineering & Foundry Co., Pittsburgh, has been elected executive vice-president and general manager. Geoffrey G. Beard, formerly sales engineer, has been appointed vice-president in charge of sales engineering. John L. Young was named manager of industrial research and William Hagel, assistant sales manager, was made manager of machinery sales.

OBITUARY...

- Alexander Laughlin, president of Alexander Laughlin & Co., which he established in 1887, died on Aug. 30 at his home. He was 77 years old. In 1904 Mr. Laughlin purchased control of the Pittsburgh Steel Construction Co., Ambridge, Pa., which was later absorbed by the Central Tube Co., also organized by him. He was president of the board of directors of the latter company until it was sold and liquidated in 1940.
- Percy O. Ott, organizer and president of the Terryolt Machine Co., Detroit, died at his home Aug. 24. Prior to his organizing of Terryolt in 1939 he was also manager of the Ott Machinery Sales Co.
- J. H. Schroeder, manager of the traffic department of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., died Aug. 24 at Birmingham. He was 58 years old. Mr. Schroeder, who went to Birmingham from Pittsburgh, became assistant traffic manager for the company in 1933. He was appointed manager five years later.
- C. W. Waterman, Sr., vice-president in charge of sales of the McNally Pittsburgh Mfg. Corp., died recently in Chicago.
- Albert Moss, executive vice-president of the Standard Rate & Data Service, died on August 15.
- Franklin D. Johnson, credit manager for Joseph T. Ryerson & Son, Buffalo, died of a heart attack August 28. He was 45 years of age.

WPB Tightening Up on Priorities

Cleveland

• • • With the easing up of the machine tool supply situation there occurs quite frequently among users of machine tools the false notion that tools are now easy to obtain. However, in such cases, the greatest obstacles to overcome are the War Production Board regulations on the purchases of such equipment and the priorities from WPB to make such purchases.

There is not and will not be the opportunity for indiscriminate buying of machine tools by any user. Restrictions on such purchases are just as rigid today as ever.

Consequently, the immediate task of any manufacturer who now wishes to supplement existing machine tool equipment, refine operating procedure through adding machine tools or extend the tooling of existing equipment, is to sell the WPB on the idea that it is necessary. After WPB is convinced that such a change is necessary, that work to be handled by the additional equipment cannot be subcontracted and that the user has a just and sound reason for wanting the

additional equipment, then priorities for the purchase of needed machine tools are given.

One additional factor enters the picture here, however, because very frequently the WPB knows of equipment that was purchased by the Government on pool orders, and, while it may not be exactly what is wanted by the manufacturer, such pool order equipment very often will be the only machine tools that will be made available to the buyer, and he can take it or do without.

Machine tool orders continue to decline through the month of August.

U. S. Is "Carbide Arsenal"

Detroi

oo In addition to shipping carbide powder to England ever since the latter's supply was shut off by the outbreak of war with Germany in 1939, the carbide industry in this country has been supplying Canada, Russia, Australia, China, Mexico, South Africa, India and others of the United Nations with carbides in various forms—from raw material to

finished product, according to the Carboloy Co., Inc., Detroit.

Canada as an example not only has obtained huge quantities of powder from the United States but also has been supplied with fabrication equipment.

Hard cemented carbide metal has been supplied steadily to Russia since the U. S. S. R. joined the allies.

Most Tool Plants Shifting To Direct War Production

Cincinnati

• • • • That the end of the heavy production in the machine tool industry is coming closer at hand is obvious in the Cincinnati area. Virtually every manufacturer in the area is pressing plans for manufacture of other than machine tools, and each week an additional company indicates further conversion. The bulk of plants in this area are now partially operating on other than machine tools. Manufacturers of heavy tools, however, have not felt the pinch quite as severely.

Tocco Appoints Distributors

Cleveland

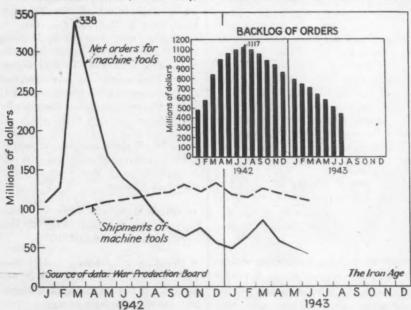
• • Appointments of Rudel Machinery Co., Inc., New York, and the Swind Machinery Co., Philadelphia, as distributors and special agents for Tocco process induction equipment were announced by Ohio Crankshaft Co., Cleveland. Rudel Machinery Co. has branch offices in West Hartford, Conn., and Boston, while Swind Machinery Co. has representatives in York, Pa., and Baltimore.

Rudel Machinery Expands

• • The Rudel Machinery Co., Inc., New York machine tool distributor, has opened an office at room 532, Statler Building, Boston 16, under the management of B. H. Shaw, formerly manager for Henry Prentiss & Co. in the Boston territory. Mr. Shaw will be assisted by Crandall Forbes, covering Boston and eastern Massachusetts; by A. C. Wilkins, of Worcester, covering central Massachusetts, Rhode Island, eastern New Hampshire and Maine; and by Clarence E. Anderson, of Springfield, covering western Massachusetts, Vermont and Western New Hampshire.

Machine Tool Shipments and Orders

• June machine tool shipments were \$108,689,000, off 5 per cent from the May volume of \$113,710,000. Net orders (new orders less cancellations) dropped 21 per cent from May to June, \$48,091,000 down to \$38,322,000. The cumulative backlog at the end of June stood at \$511,478,000. This compares with an alltime peak of 1,117,391,000 worth of undelivered orders on the books in July, 1942. Source of data: War Production Board.





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ARMSTRONG-BLUM MFG. CO. "The Hack Saw People"

5700 Bloomingdale Ave. Chicago, U. S. A. Eastern Sales Office: 225 Lafayette St., New York

NON-FERROUS METALS

. . . News and Market Activities

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Phelps Dodge Gets Light Metal Plant

• • • Phelps Dodge Copper Products Corp. will shortly equip and operate a 12-acre DPC extrusion plant for the production of aluminum and magnesium tubes, shapes and rods.

To assist in getting this plant into production at the earliest possible date, the Pullman Standard Car Mfg. Co. has agreed to sell to DPC one of their buildings and a large tract of land at its Hammond, Ind., plant. An addition to this building will be made.

The Hammond plant will mark the first large scale extension of the company's fabricating activities with metals other than copper and copper

Pay Rise for Anaconda Miners

• • • A dollar a day increase for 450 chrome miners employed by the Anaconda Copper Mining Co. in mines near Columbus, Mont., has been unanimously approved by the NWLB. The approved increase will bring the rate for miners to seven dollars a day, the minimum of the sound and tested going rates tentatively established for that job in the Montana area.

The United Mine Workers of America, District 50, represents the employees. These mines have been operated by Anaconda since January, 1941, for the United States Government which owns the mines.

In ordering the increase which goes back to Nov. 1, 1942, the board urged employees to put the retroactive pay into war bonds.

NLWB Orders Pay Adjustment

• • To complete the industry-wide stabilization program in the nonferrous metals mines in Kansas, Missouri and Oklahoma, the NWLB has authorized the Non-Ferrous Metals Panel for the Tri-State Area to approve wage adjustments in conformance with the recent order of the WLB's Non-Ferrous Metals Commission. The increases contained in the order were approved by Judge Fred M. Vinson, Director of Economic Stabilization.

The increases must be consistent with the relationship which has existed between the wage rates of the employees covered by the directive order and those coming before the panel for adjustment. The increases must not be made the basis of an application to increase price ceilings.

The Non-Ferrous Metals Commission, in its recent order, directed five companies to grant a 50c. general wage increase per shift to all employees within the bargaining unit. The workers were represented by the International Union of Mine, Mill and Smelter Workers, CIO.

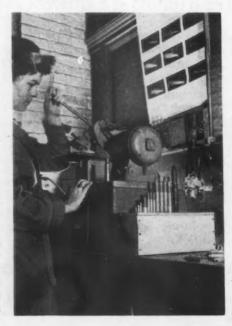
The Non-Ferrous Metals Panel was established for the Seventh Regional War Labor Board in Kansas City by the WLB on July 29, 1943.

Under this order, the panel has been authorized to approve adjustments for companies outside of the original order engaged in the industry in the area and for particular employees of the companies who were involved in the order.

Pricing Die Castings

• • • The recent reduction in the price of secondary aluminum has raised questions regarding the pricing procedures required on die castings under Maximum Price Regulation 377. OPA has ruled that base period die castings which were frozen

IMPORTANT ROLE: Lois Mad-den, laboratory assistant at Rem-ington Arms Co.'s Bridgeport laboratory, tests the cases of various types of small arms ammunition.



at their lowest prices during the period April 1, 1942, to May 1, 1943, need not be reduced to compensate for the reduction in secondary metal price.

It was pointed out further that in pricing new die castings under the formula provisions of the regulation, it was required that the new lower metal prices be used in the formula.

The ruling was held applicable both in pricing new die castings or in estimating the price of reordered die castings, for purposes of comparison with a frozen price in order to determine whether or not the "five per cent difference in manufacturing costs" clause is applicable.

OPA also pointed out that any die caster could reduce, voluntarily, the prices of the freeze period casting to reflect the metal price reduction, without affecting the legal ceilings which could thus automatically be reestablished in the event of an upward movement of secondary metal prices.

Non-Ferrous Founders Meet

• • • Copies of the stenographic report of the organization meeting held in Cleveland on August 24 of the Non-Ferrous Foundry Industry Adivsory Committee appointed by OPA were released today by the court reporter who covered the meetings.

The committee members, in a session from which the OPA officials excused themselves, selected as their chairman E. W. Horlebein, president. Gibson & Kirk Co., Baltimore.

Before adjournment Chairman Horlebein, on behalf of his fellow committeemen assured Price Executive John D. Sumner of the OPA and his associates that they could depend on this committee to seriously undertake the assignments for which the committee was set up, namely, to truly represent not only the industry in interpreting its views to the OPA, but also of getting to the members of the industry the fullest possible understanding of the obligations the Emergency Price Control Act has imposed on the Office of Price Administration.

On the specific assignment of reviewing the provisions of Revised Maximum Price Regulation No. 125, and of considering recommendations for modifications in it, he said all members of the committee realize that the present regulation now in force should be scrupulously observed pending such time as amendments may be officially made to it.

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Copper, Lake	12.00
Tin. Straits, New York	52.00
Zinc, East St. Louis	8.25
Zine, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, virgin 99+%, delivered	15.00
Nickel, electrolytic, base refinery	35.00
Magnesium, 99.9+%, carlots	21.50
Magnesium, 12-in. sticks, carlots	30.00
Cadmium, delivered	90.00
townsparence Mr. 10 down days and do	137-

Copper, Copper Base Alloys

(Mill base prices)

Sheet: Copper, 20.87c.; high brass, 19.48c.; low brass, 80 per cent, 20.15c.; ed brass, 85 per cent, 20.36c.; commercial bronze, 90 per cent, 21.07c., 95 per cent, 21.28c.; manganese bronze, 28.00c.; muntz metal, 22.75c.; naval brass, 24.50c.; hosphor bronze, grades A, B, 5 per cent, 6.25c.; Everdur, Herculoy, Olympic or equivalent, 26.00c.; nickel silver, 5 per cent, 26.50c.

Rods: Copper, hot rolled, 17.37c.; drawn, 18.37c.; free cutting brass, 15.01c.; low brass, 80 per cent, 20.40c.; red brass, 85 per cent, 20.61c.; commercial bronze, 90 per cent, 21.32c., 95 per cent, 21.53c.; Muntz metal, 18.87c.; naval brass, 19.12c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculoy, Olympic or equivalent, 25.50c.; nickel silver, 5 per cent, 28.75c.

Extruded Shapes: Copper, 20.87c.; architectural bronze, 19.12c.; manganese bronze, 24.00c.; Muntz metal, 20.12c.; naval brass, 20.37c.

ALUMINUM

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. per lb. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier: 28 and \$\$, 21.2c. per lb.; 52S, 24.2c.; 61S, 22.8c.; 24S. 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base price for tubing; 30,000-lb. base price for plate, flat stock. Variations from the above gage, size, temper, faish and quantity require extras.

Extruded Shapes: "As extruded" temper; 2000-lb, base price. 2S and 3S, factor No. 1 to 4, 25.5c. per lb.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 16.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by the weight per lineal foot. All prices above are subject to factor number range, temper, length, dimensional tolerances and quantity

Wire, Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ½ in., 24½c. per lb.: ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ½ in., 34c, per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 25c.; 1 in., 25c.; 2 in., 25c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in.

thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.: 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Variation from the above size, temper, finish and quantity require extras.

MAGNESIUM

Sheet, rod, tubes, bars and extruded shapes are subject to individual quotation. Magnesium Metal Turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c a lb.

NON-FERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloy

(Current OPA maximum prices, cents per lb., f.o.b. point of shipment, plus pre-miums for quantities and special preparation.)

OP	A	Group	1
NT-	-	malma 1	N.T

No. 1 wire. No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1	
tinned heavy copper	9.75
No. 2 wire, mixed heavy copper.	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
Lead covered copper wire, cable	6.00
Lead covered telephone, power	
cable	6.04
Insulated copper	5.10

OPA Group 2	
	15.50
Bell metal	13.25
High grade bronze gears	
High grade bronze solids	11.50
Low lead bronze borings	
Babbitt lined brass bushings	
High lead bronze solids	10.00
High lead bronze borings	10.00
Red trolley wheels	
Tinny (phosphor bronze) boring	
Tinny (phosphor bronze) solids.	
Copper-nickel solids and borings	
Bronze paper mill wire cloth	
Aluminum bronze solids	
Soft red brass (No. 1 compositio	
Soft red brass borings (No. 1)	
Gilding metal turnings	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes .	7.75
Cocks and faucets	
Mixed brass screens	
Red brass breakage	
Old nickel silver solids, borings	
Copper lead solids, borings	
Yellow brass castings	0.2

OPA Group 3

Yellow brass soft sheet clippings.	8.62
Yellow rod brass turnings	8.378
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	8.00
Old rolled brass	7.75
Admiralty condenser tubes	8.00
Muntz metal condenser tubes	7.50
Plated brass sheet, pipe reflectors	7.50
Manganese bronze solids	7.251
	6.25
Manganese bronze borings	6.501
	5.50
OPA Group 4	

Automobile radiators 7.00

OPA Gr	oup 5											
Refinery	brass						×				*	5.00

*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

Aluminum

(Current OPA maximum prices, cents per lb., for less than 1000 lb. lots, f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
Wrought alloys (17S, 18S, 32S,	
52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50
Plant scrap, mixed	
All solids	7.50
Borings and turnings	5.50

Oheolete scrap

Costicio scrup	
Pure cable	9.00
	7.50
Old castings and forgings	8.00
Pistons, free of struts	8.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For lots of 1000 to 19,999 lb., add 1c. to above prices except for old castings and forgings, pistons free of struts, pistons with struts and old alloy sheet for which there is a premium of 4c. a lb. For lots over 19,999 lb. add 14c. a lb. to prices listed.

Magnesium

Segregated plant scrap

	Ch	*			
Pure :	solids	and all	other	solids,	exemp
Boring	s and	turnings			8.00

Mixed, contaminated plant scrap

Grade	1	solids .						11.00
				turnings				7.00
Grade	2	solids .			*		×	9.00
Grade	2	borings	and	turnings				5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

(Current OPA maximum prices, cent. lb., f.o.b., shipping point.)	9 per
New zinc clippings, trimmings	7.25
Engravers', lithographers' plates	7.25
	5.75
	5.80
	5.80
	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Soft and hard lead, including cable lead, f.o.b. point of shipment, deduct 0.55c. per lb. from basing point prices for refined metal.

Nickel

Nickel content 98 + per cent, copper under ½ per cent, 26c. per lb.; 90 to 98 per cent nickel, 23c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

(Cents per lb., f.o.b. shipping	point)
Copper: Cast, elliptical, 15 in.	
	051/
and longer	25 1/8
Electrolytic, full size	22%
cut to size	303/4
Rolled, oval, straight, 15 in.	-
and longer	2314
Curved	2414
	0276
Brass: Cast, 82-20, elliptical,	
15 in. and longer	23 %
Zinc: Cast, 99.99, 16 in. and	
over	16%
Nickel: 99% plus, cast	47
Dellad depolarized	48
Rolled, depolarized	10
Silver: Rolled, 999 fine per	
Troy (1-9) oz., per oz	58

Chemicals	
(Cents per lb., delivery from New	w York)
Copper cyanide. tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls13.	.00-13.50
Nickel salts, single, 425-lb.	34.00
Silver cyanide, 100 oz. lots40.8	2-41.125
Sodium cyanide, 96% dom., 100-lb. dms	0.15 33.00
bbls	0.00

Pre-Emergency Scrap Drive Planned

• • • Scrap collections which have been exceptionally poor for many months have at last aroused Washington bigwigs to the point where another national appeal for salvage is imminent. John T. Whiting, director of the WPB Steel Division was the first to break the news in a letter to all steel companies requesting cooperation with any salvage drives which may be inaugurated.

While no concerted drive has yet been made public, one is planned for the Oct. 1 to Nov. 15 period aimed at getting scrap into the yards before the cold Winter months. WPB admits that household scrap will probably not be produced in the quantities formerly received and, judging from Mr. Whiting's letter to Steel Division clients, looks to dormant and obsolete machinery for the bulk of any collections.

WPB Lauds Salvage Methods At Eclipse-Pioneer

Detroit

• • • Scrap salvage methods at the Eclipse-Pioneer Div. of Bendix Aviation Corp. have won the praise of the War Production Board. The plant machines steel, aluminum, magnesium, copper, bronze and brass. To salvage chips and trimmings in orderly fashion, the engineers evolved a simple system of card labels, and the proper card is placed on each machine to designate the type of metal and alloy being worked. Clean-up men who empty turnings or chips from the machines utilize these cards to keep metals segregated by type throughout all stages of recovery, saving time in processing of scrap through crushers; and centrifugal force machines are employed to separate the oil from the

Salvage at this plant runs more than a million pounds of steel shavings monthly, 85,000 lb. of aluminum, 35,000 lb. of magnesium, and 35,000 lb. of brass, copper and bronze.

BUFFALO—Several barge fleets carrying scrap were coming up the state canal this week with an estimated 10,000 tons destined for Buffalo district consumers. There was no indication the fleet was bringing the first war scrap to Buffalo, an

Washington, many onlookers are inclined to believe that a scrap drive soon would net small tonnage. The reasons being that poor collections even now are the result of some very sound circumstances.

First, the ranks of the peddlers have been allowed to dwindle to a skeleton; second, the manpower shortage is very real in the scrap industry and; third, last year's forced-draft drives have bared many mill yards and farms of dormant scrap which has not reappeared. Demolition has always been a slow and costly way of producing scrap and probably cannot be relied upon heavily. Likewise, the effects of M-311 have slowed the flow of auto graveyard scrap to a near halt. Farms are in the throws of harvests and hamstrung with gasoline shortages so that poor collections have been the word of the day from that source, too.

event eagerly awaited. When the war scrap starts rolling in in quantities it is expected the barge canal will be one of the natural carriers as barges can be loaded anywhere in the New York City waterfront area and reach Buffalo without transshipment. Little activity was reported in the yards this week, but some additions to winter stockpiles of local mills were made.

NEW YORK—With blast furnace operators wanting to conserve their coal supplies the demand for borings and turnings has increased. The supply, however, has fallen off. Solid alloy material and triple alloys are still very difficult to sell. Although any future scrap drive will not bring out the quantitles achieved last year, the necessity for one is reported pressing.

PHILADELPHIA—Industrial scrap as well as dealers' scrap is continuing to fall off in quantity. Borings and turnings

Cabot Leaves Sept. 14; H. M. Faust Takes Over

Washington

• • • Paul C. Cabot, well known and well liked director of the WPB Salvage Division, will not make his resignation effective until Sept. 14 it was made known in a press conference last week. His successor, who will be formally announced on Sept. 9, will be Herbert M. Faust, advertising manager of the Curtis Publishing Co.

which about half a year ago were difficult to move have had a considerable increase in demand especially for blast furnace use. Because of the changeover from alloy to high carbon steel specifications and the WPB ruling that alloy scrap be used only in the making of alloy steel, alloy grades are backing up in the plants. It is quite probable that a revision will have to be made in order M-24-c to permit mills to accept this grade. Inventories here are still good but the situation for the winter months looks dreary. Only a scrap drive could improve stocks.

BIRMINGHAM—The beginning of the first month of fall has brought no pickup in activity for the scrap market here. There is little demand for material and very little scrap on dealers yards.

CLEVELAND—Cast grades and low phos scrap have been unusually tight for the past several weeks. Scrap supplies at the mills are now running between seven and ten weeks, with the mills in the valley district slightly less. There is no immediate concern felt in regard to scrap supplies, but there is always the underlying feeling that scrap might be practically exhausted during the cold winter months when the incoming supplies to yards and mills are normally very low.

Alloy turnings seem to be in bette supply, but not to the point that the go begging for a buyer. Carbon stee turnings, that is, unalloyed turnings, are as tight as ever.

CINCINNATI — The district market shows relatively no change from the quietude of previous weeks. Some modest increase in demand for cast grades is reported by dealers but this is largely from out of the district sources. The labor situation continues to slow up yard operations on what material is now coming in. Collections are still off, although production scrap is reported to be in fair volume.

PITTSBURGH—The market here is growing tighter. All consumers are taking in as much material as can be obtained. There is no fear of a serious shortage this Fall but steel plants have become cautious and have lost all of the "carefree" attitude on the matter of sufficient scrap supplies. Most gathering of material is being done quietly but all interests but one are taking all available scrap. The major interest is taking all the scrap that it can get especially in view of the added open hearth capacity in this district in the past two months.

BOSTON—Most of the trade say business remained quiet before Labor Day with shipments confined largely to Nos 1 and 2 steel, mostly No. 2, and turnings. It is hoped things will now pick up, but the trade is skeptical about tonnages to be available. WPB salvaged, shipyard and battlefield scrap will be the most prolific sources.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES (All Prices Are Per Gross Ton) Heavy Structural Low Phos. BASIC OPEN HEARTH GRADES Foundry Steel No. 1 & 2
Hvy. Melt.
No. 1 Cp.
Bik. Shts.
No. 1 & 2
Bundles Machine
No. 1
Shop
Turnings
Turnings

**5.00

5.00 **BLAST FURNACE GRADES Bar Bar
Crops,
PunchIngs
Plate
Scrap
and 3ft. 2ft. 1ft. 2ft. 1ft.
Cast and and and and and
Steel Under Under Under Under Alloy Heavy
Free Axle
Aute. Low and
Springs, Phos. Forge
and Turn. Electric
Crank- Sulphur First Furnace
shafts Turnings Cut Bundles Pittsburgh, Brackenridge,
Butler, Monessen, Midland,
Johnstown, Sharon, Canton,
Steubenville, Warren,
Youngstown, Weirton
Cleveland, Middletown,
Cinclinnati, Portsmouth.
Chicago, Claymont, Coatesville,
Conshohocken, Harrisburg,
Phoenixville, Sparrows Point.
Ashland, Ky.
Bethlehem, Pa., Kokomo, Ind.
Duluth, Milm. Bioom Forge Crops Shovelling No. 2 Turnings Busheling \$17.00 \$17.50 \$25.00 \$22.50 \$21.50 \$22.00 \$22.50 \$21.50 \$22.00 \$21.80 \$18.00 \$19.50 \$21.00 \$16.00 24.50 22.00 21.00 21.50 22.00 21.00 21.50 20.50 17.50 19.00 20.56 13.75 14.50 14.25 13.25 13.00 12.85 12.85 12.50 13.75 14.50 14.25 13.25 13.00 12.85 12.85 12.50 16.25 17.00 16.75 15.75 15.50 15.35 18.75 19.50 19.25 18.25 14.78 15.50 15.25 14.25 14.00 13.85 13.85 20.75 21.50 21.25 20.25 20.00 19.85 16.75 17.50 17.25 16.25 16.08 15.85 23.75 24.50 24.25 23.25 23.00 22.85 21.25 22.00 21.75 20.75 20.25 21.00 20.75 19.75 19.50 19.35 21.25 22.00 21.75 20.75 20.50 20.35 20.25 21.00 20.75 19.75 19.50 19.35 20.75 21.50 21.25 20.25 20.00 19.85 19.75 20.50 20.25 19.25 16.50 16.25 15.25 15.00 14.85 14.85 18.75 17.75 17.50 17.35 Duluth, Minn.... Detroit, Mich.... 18.00 20.50 do, Ohio. Toledo, Onto.
St. Louis, Mo.
Atlanta, Ga.; Alabama City, Ala.;
Birmingham, Los Angeles;
Pittsburg, Cal.; San Francisco
Minnequa, Cole.
Seattle, Wash. 19.00 17.50 17.00 14.50 14.00 12.00 *Baled turnings are \$5 per gross ton higher,

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at \$14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 34c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above

for the scrap at the basing point in which the shipping point is located. minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

INPREPARED SCRAP: For unprepared scrap, maximum prices

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulis, slag reclaim, stc., of 85% or more Fe priced—\$2; 75 to 85% Fe—\$4; under 75% Fe—\$8 per ton. Mill scale of 65% or more Fe—\$8 per ton. Mill cinder and grindings, shipping point maximum price of \$4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean. containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

At Memphis 50c.: Great Lakes ports \$1: New England \$1.25.

	RAILR	OAD SC	RAP	s	crap Rall	
Cieveland, Cincinnati.	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Ashland, Portsmouth,						
Middletown	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.80
Canton, Pittsburgh,						
Sharon, Steubenville,						
Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
hicago, Philadelphia,		00 30	00.00	00.98	00 00	00 00
Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Suffaio	20.25	21.25	22.75	23,25	23.50	23.75
Detroit		19.85	21.35	21.85	22.10	22.35
Duluth		20.00	21.50	22.00	22.25	22.5
Cansas City, Mo	17.00	18.00	19.50	20,00	20.25	20.50
Cokomo, Ind	19.25	20.25	21.75	22,25	22.50	22.7
eattle		16.50	18.00	18.50	18.75	19.0
St. Louis	18.50	19.50	21.00	21.50	21.75	22.0

CAST IRON	SCRAP		
	Group A	Group B	Greup C
No. 1 cupola cast	\$18.00	\$19.00	\$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Maileable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas. Oklaboma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Me.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

		E	ß,	A	8	1	S		X	9	R	ı	C	1	E		SEGREG	ATED
																	Solids,	
																		Lb. Cont. W
Type	1																\$1.80	\$1.60
Type	2																1.60	1.40
Type	3																1.25	1.25
Type	4.																0.125	0.105
Type	5.	1															9.135	0.115
·P	er	1	h		4	of	f	1	Be	21	ra	u	0		B	ne	terial.	
-		77.	**		- 7	φ,	•	- 2				٠,	m		••			

BASE PRICE UNSEGREGATED SOLIDS \$1.50 per lb. contained W if 5% or more. \$1.15 per lb. contained W if over 1% and less than 5%.

\$0.80 per lb. contained Mo if 11/2% or more.

BASE PRICE UNSEGREGATED TURNINGS \$1.30 per lb. contained W if 5% or more. \$1.00 per lb. contained W if 1% and less than 5%. \$0.70 per lb. contained Mo if 11/2% or more.

THE IRON AGE, September 9, 1943-147

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market rom th me mod grades i largely ces. The up yard low com although e in fair

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abor Day to Nos. k up, but nnages to shipyard the mos

say busi-

Comparison of Prices . .

Advances Over Past We	ek in H	leavy Ty	pe; Decline	es in Italics. [Prices Are F.O.B. Major Basing Points]
Flat Rolled Steel: Sept. 7, (Cents Per Lb.) 1943	Aug. 31, 1943	Aug. 10,	Sept. 8, 1942	Pig Iron: Sept. 7, Aug. 31, Aug. 10, Sept. 8, (Per Gross Ton) 1943 1943 1943 1942
Hot rolled sheets 2.10 Cold rolled sheets 3.05 Galvanized sheets (24 ga.) 3.50 Hot rolled strip 2.10 Cold rolled strip 2.80 Plates 2.10 Plates, wrought iron 3.80 Stain's c.r. strip (No. 302) 28.00	2.10 3.05 3.50 2.10 2.80 2.10 3.80 28.00	2.10 3.05 3.50 2.10 2.80 2.10 3.80 28.00	2.10 3.05 3.50 2.10 2.80 2.10 3.80 28.00	No. 2 fdy., Philadelphia\$25.84 \$25.89 \$25.89 No. 2, Valley furnace 24.00 24.00 24.00 No. 2, Southern Cin'ti 24.68 24.68 24.68 24.68 No. 2, Birmingham 20.38 20.38 20.38 20.38 No. 2, foundry, Chicago† 24.00 24.00 24.00 24.00 Basic, del'd eastern Pa 25.39 25.39 25.39 25.39 Basic, Valley furnace 23.50 23.50 23.50 24.00 Malleable, Chicago† 24.00 24.00 24.00 24.00 Malleable, Valley 24.00 24.00 24.00 24.00
Tin and Terne Plate: (Dollars Per Base Box)				L. S. charcoal, Chicago 31.34 31.34 31.34 31.34 Ferromanganese‡135.00 135.00 135.00 135.00
Tin plate, standard cokes \$5.00 Tin plate, electrolytic 4.50 Special coated mfg. ternes 4.30	\$5.00 4.50 4.30	\$5.00 4.50 4.30	\$5.00 4.50 4.30	†The switching charge for delivery to foundries in the Chicago district is 60c, per ton. ‡For carlots at seaboard.
Bars and Shapes: (Cents Per Lb.)				
Merchant bars 2.15 Cold finished bars 2.65 Alloy bars 2.70	2.15 2.65 2.70	2.15 2.65 2.70	2.15 2.65 2.70	Scrap: (Per Gross Ton) Heavy melt'g steel, P'gh.\$20.00 \$20.00 \$20.00 \$20.00
Structural shapes 2.10 Stainless bars (No. 302) 24.00 Wrought iron bars 4.40	2.10 24.00 4.40	2.10 24.00 4.40	2.10 24.00 4.40	Heavy melt'g steel, Phila. 18.75 18.75 18.75 18.75 Heavy melt'g steel, Ch'go 18.75 18.75 18.75 18.75 No. 1 hy. comp. sheet, Det. 17.85 17.85 17.85 17.85 Low phos. plate, Youngs'n 22.50 22.50 22.50 22.50
Wire and Wire Products: (Cents Per Lb.)				No. 1 cast, Pittsburgh 20.00 20.00 20.00 20.00 No. 1 cast, Philadelphia. 20.00 20.00 20.00 20.00
Plain wire 2.60 Wire nails 2.55	2.60 2.55	2.60 2.55	2.60 2.55	No. 1 cast, Ch'go 20.00 20.00 20.00 20.00
Rails: (Dollars Per Gross Ton)				Coke, Connellsville:
Heavy rails\$40.00 Light rails40.00	\$40.00 40.00	\$40.00 40.00	\$40.00 40.00	(Per Net Ton at Oven) Furnace coke, prompt \$6.50 \$6.50 \$6.50 Foundry coke, prompt 7.50 7.375 6.875 6.875
Semi-Finished Steel: (Dollars Per Gross Ton)				Non-Ferrous Metals:
Rerolling billets\$34.00	\$34.00	\$34.00	\$34.00	(Cents per Lb. to Large Buyers)
Sheet bars 34.00 Slabs 34.00 Forging billets 40.00 Alloy blooms, billets, slabs 54.00	34.00 34.00 40.00 54.00	34.00 34.00 40.00 54.00	34.00 34.00 40.00 54.00	Copper, electro., Conn 12.00 12.00 12.00 12.00 Copper, Lake, New York. 12.00 12.00 12.00 12.00 Tin (Straits), New York. 52.00 52.00 52.00 52.00 Zinc, East St. Louis 8.25 8.25 8.25
Wire Rods and Skelp: (Cents Per Lb.)				Lead, St. Louis
Wire rods	2.00 1.90	2.00 1.90	2.00 1.90	Magnesium, ingot 20.50 20.50 20.50 22.50 Antimony (Asiatic), N. Y. 16.50 16.50 16.50
The medan to the control of the				

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 145-157.

Composite Prices . .

	FINISHED STE	EL	PI	G IRON Gross Ton	SCRAI	STEEL
Sept. 7, 194	432.25513c	. a Lb	23.61 8	Gross Ton		
ne week a	ago2.25513c	. a Lb		Gross Ton	\$19.17 a	
ne month	ago2.25513c	. a Lb	23.61 8	Gross Ton	\$19.17 a	
one year ag	go2.26190c	a Lb	23.61	Gross Ton	\$19.17 a	Gross Ton
	HIGH	LOW	HIGH	LOW	HIGH	LOW
943	2.25513c.,	2.25513c.,	\$23.61		\$19.17	\$19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
941	2.43078c.,	2.43078c.,	\$23.61, Mar. 2		\$22.00, Jan. 7	
940		2.24107c., Apr. 16		3 22.61, Jan. 2	21.83, Dec. 30	
.939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 1		22.50, Oct. 3	
938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 2		15.00, Nov. 22	
937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar.	9 20.25, Feb. 16	21.92, Mar. 30	
936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 2	4 18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov.	5 17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May	1 16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933		1.75836c., May 2	16.90, Dec.	5 13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan.	5 13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan.	6 14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan.	7 15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May	14 18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
		ex based on steel			Based on No.	1 heavy melting
	bars, beams, tan	k plates, wire, rails,		rages for basic iron	steel scrap quota	tions to consumers
	and strip, repres	and cold-rolled sheets enting 78 per cent of		ces and foundry iron hiladelphia, Buffalo,		iladelphia and Chi-
	the United State	es output. Index re-		thern iron at Cincin-		
	capitulated in At	rg. 28, 1941, issue.	nati.			

Prices of Finished Iron and Steel-

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 ner cent tax on freight rates.

Basing Point								-				10	DEL	VERED	TO
Product	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham		Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
HEETS Hot rolled	2.10¢	2.10∉	2.10€	2.10∉	2.10∉	2.10∉	2.10∉	2.10∉	2.20€	2.10¢		2.65∉	2.20€	2.34∉	2.27∉
Cold rolled ¹	3.05€	3.05€	3.05€	3.05€		3.05€	3.05€		3.15€	3.05∉		3.70∉	3.15∉	3.39€	3.37¢
Galvanized (24 ga.)	3.50∉	3.50€	3.50€		3.50€	3.50€	3.50€	3.50€	3.60€	3.50€		4.05€		3.74¢	3.67€
Enameling (20 ga.)	3.35€	3.35≰	3.35€	3.35¢			3.35€		3.45€	3.35∉		4.00∉	3.45¢	3.71€	3.67∉
Long ternes ²	3.80∉		3.80∉									4.55€		4.16¢	4.12¢
STRIP Hot rolleds	2.10∉	2.10∉	2.10¢	2.10∉	2.10∉		2.10∉			2.10€		2.75€	2.20€	2.46∉	
Cold rolled4	2.80€	2.90€		2.80∉			2.80€	(Wor	cester =	3.00¢)			2.90 €	3.16∉	
Cooperage stock	2.20∉	2.20∉			2.20∉		2.20€							2.56¢	
Commodity C-R	2.95€	3.05 €		2.95€			2.95€	(Wo	rcester =	3.35€)			3.05€	3.31¢	
TIN MILL PRODUCTS Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.36€	5.32∉
.50 .75 Electro tin plate, box	\$4.50 \$4.65	\$4.50	\$4.50 \$4.65												
Black plate, 29 gage ⁵	3.05€	3.05€	3.05€						3.15∉			4.05 412			3.37∉
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS Carbon steel	2.15€	2.15∉	2.15#	2.15∉	2.15∉	2.15∉		(D	uluth = 2	.25¢)	2.50∉	2.80∉	2.25€	2.49¢	2.47¢
Rail steel ⁶	2.15€	2.15€	2.15¢	2.15€	2.15€	2.15€					2.50€	2.80€			
Reinforcing (billet)7	2.15∉	2.15∉	2.15∉	2.15∉	2.15	2.15€	2.15€	2.15€			2.50€	2.55¢13	2.25∉	2.39¢	1
Reinforcing (rail)7	2.15	2.15∉	2.15∉	2.15¢	2.15∉	2.15∉	2.15€				2.50€	2.55¢13	2.25≰		2.47€
Cold finished ⁸	2.65€	2.65∉	2.65€	2.65€		2.65€			(Detroi	t = 2.70¢)				2.99€	2.97∉
Alloy, hot rolled	2.704	2.70∉				2.70€	(E	Bethlehe	m, Massi	llon, Can	ton = 2.7	(0¢)	2.80€		
Alloy, cold drawn	3.35€	3.35∉	3.35€	3.85€		3.35€							3.45€		
PLATES Carbon steel	2.104	2.10é	2.104	2.104	2.10é		2.10é	1	atesville	and Clay	mont = 2		2.31é	2.294	2.15é
Floor plates	3.356				-	-	-	2120		-	3.70€	4.00€		3.71é	3.67€
Alloy	3.506	-		-	(Coa	tesville =	3.50é)	-	-	-	3.95é	4.15é		3.70€	3.59€
SHAPES Structural	2.10		2.10∉		2.10€	1		Bethleh	em = 2.1	0¢)	2.45€			2.27€	2.215
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80			2.80€			(Wo	rcester =	3.00¢)						
0.51 to 0.75 Carbon	4.30			4.30€			(Wo	rcester -	4.50¢)						
0.76 to 1.00 Carbon	6.15			6.15€			(Wo	rcester =	6.35¢)						
1.01 to 1.25 Carbon	8.35			8.35€			(Wo	rcester =	8.55¢)						
WIRE® Bright18	2.60	2.60€		2.60	2.60€		(Wo	rcester	2.70¢)			3.10∉			2.92€
Galvanised ·		-1		1	add pr	oper size	extra an	d galva	nized ext	ra to brig	tht wire l	base, abo	ve.		
Spring (High Carbon)	3.20	3.20€		3.20			(Wo	rcester	=3.30¢)			3.70€			3.52€
PILING Steel sheet	2.40	2.40¢				2.40						2.95			2.72

¹ Mill run sheets are 10c, per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁶ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also sharting. For quantities of 20,000 to 29,999 lb. ⁶ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹² Boxed. ¹² Portland and Seattle price, San Francisco price is 2,50c. ¹⁴ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote 2.35c., Chicago base. On Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.30c. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp, may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and S

ept. 8, 1942 25.89 24.00 24.68 20.38 24.00 25,39 23.50 24.00 24.00 135.00 he Chi-

\$20.00 18.75 18.75 17.85 20.00 20.00 20.00

> 12.00 12.00 52.00 8.25 6.35 15.00 35.00

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W .17 Apr. 10 Apr. 9 May 16 June June June Apr. Sept. Jan. July 29 Dec. Dec. Dec. melting onsumers and Chi-

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 43)

*Philadelphia *New York *Boston *Boston *Baltimore *Norfolk *Washington *Chicago *Milwaukee *Cleveland *Buffalo *Detroit *Cincinnat! *St. Louis *Pittsburgh *St. Paul *Omahe *Indianapolis Birmingham Memphis New Orleans New Orleans Houston		SHEETS		STI	RIP		Structural Shapes	BA	RS	ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled	Plates 1/4 in. and heavier		Hot Rolled	Cold Finished	†† Hot Rolled, 2300	‡ Hot Rolled, 3100	†† Cold Drawn, 2300	‡ Cold Drawn, 3100
New York Boston Baltimore. Norfolk. Washington. Chicago. Milwaukee Cleveland. Buffaio. Detroit Cincinnati. St. Louis. Pitsburgh St. Paul Omaha Indianapolis. Birmingham. Memphis New Orleans.	3.25 3.35 3.35 3.45 3.425 3.397 3.51 3.865 3.453 3.453 3.453	\$4.8725 4.6132 4.744 4.862 4.965 4.841 4.20 4.3372 4.40 4.50 4.4752 4.46 4.4752 4.46 4.50 5.443 3.58 4.66 4.95 5.7.15 7.56	\$5.018 5.010 5.224 4.994 5.371 5.196 5.234 5.2724 4.774 4.754 5.004 4.8251 5.1724 5.6084 4.751 5.6084 4.751 5.25 6.60 5.70 6.60	\$3.922 3.9746 4.106 4.106 4.041 3.800 3.730 3.60 3.700 3.675 3.700 3.675 3.700 3.615 4.918 3.703 4.918 4	\$4.772 4.774 4.775 4.752 4.865 4.741 4.653 4.653 4.653 4.653 4.653 4.653 4.653 4.653 4.653 4.7913 4.45 4.355 4.355	\$3.605 3.768 3.971 3.594 3.971 3.55 3.63 3.63 3.63 3.63 3.611 3.81° 4.168 4.78 3.55 3.90 5.25 3.90 4.78 4.7	\$3.666 3.758 3.912 3.759 4.002 3.930 3.55 3.687 3.588 3.40 3.691 3.691 3.691 3.693 3.553 3.95 3.95 3.95 4.165 4.40 4.35 4.60 4.35	\$3.822 \$3.853 4.045 3.802 4.065 3.941 3.50 3.35 3.35 3.45 3.769 4.118 3.593 3.593 3.593 3.593 3.493 4.10 3.769 4.110 3.769 4.100 3.769 4.100 4.100 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0000 4.0	\$4.072 4.103 4.144 4.052 4.165 4.041 3.75 3.87 3.75 3.75 3.80 4.011 4.031 3.75 4.361 4.43 4.31 4.60 4.50 5.70	6.008 6.182 5.75 5.987 5.986 5.75 6.08 6.131 5.75 6.09	\$7.116 7.158 7.312 6.90 7.137 7.106 6.90 7.23 7.281 7.24 7.24 7.23	7.303 7.344 6.85 7.087 6.85 6.85 7.159 7.231 6.95 7.561 7.18	8.453 8.494 8.00 8.237 8.00 8.309 8.381 8.25 8.711 8.33

NATIONAL EMERGENCY (N. E.) STEELS

(Hot Rolled Mill Extras for Alloy Content)

NE 1330 NE 1340 NE 1345 NE 1345 NE 1350 NE 8613 NE 8615 NE 8617 NE 8620 NE 8630 NE 8637 NE 8637 NE 8640 NE 8640 NE 8640		CHEMIC	CAL CO	MPO	SITION LI	MITS, PE	R CENT			sic Hearth	Electric Furnace	
Designa- tion	Carbon	Man- ganese	Phos- phorus Max.		Silicon	Chro- mium	Nickel	Molyb- denum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330 NE 1335 NE 1340 NE 1345 NE 1350	.28/ .33 .33/ .38 .38/ .43 .43/ .48 .48/ .53	1.60/1.90 1.60/1.90 1.60/1.90 1.60/1.90 1.60/1.90	.040 .040 .040 .040 .040	.040 .040 .040 .040	.20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35				.10c .10 .10 .10	\$2.00 2.00 2.00 2.00 2.00 2.00		
NE 8613 NE 8615 NE 8617 NE 8620 NE 8635 NE 8635 NE 8637 NE 8640 NE 8642 NE 8645 NE 8645	.12/ .17 .13/ .18 .15/ .20 .18/ .23 .28/ .33 .33/ .38 .35/ .40 .38/ .43 .40/ .45 .43/ .48 .48/ .53	.70/ .90 .70/ .90 .70/ .90 .70/ .90 .70/ .90 .75/1.00 .75/1.00 .75/1.00 .75/1.00	.040 .040 .040 .040 .040 .040 .040 .040	.040 .040 .040 .040 .040 .040 .040 .040	.20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35	.40/ .60 .40/ .60 .40/ .60 .40/ .60 .40/ .60 .40/ .60 .40/ .60 .40/ .60 .40/ .60 .40/ .60	.40/ .70 .40/ .70 .40/ .70 .40/ .70 .40/ .70 .40/ .70 .40/ .70 .40/ .70 .40/ .70 .40/ .70	.15/ .25 .15/ .25 .15/ .25 .15/ .25 .15/ .25 .15/ .25 .15/ .25 .15/ .25 .15/ .25 .15/ .25	.75 .75 .75 .75 .75 .75 .75 .75 .75 .75	15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00 15.00	1.25 1.25 1.25 1.25 1.25 1.25 1.25 1.25	25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00 25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255 NE 9260 NE 9262	.50/ .60 .55/ .65 .55/ .65	.70/ .95 .75/1.00 .75/1.00	.040 .040 .040	.040 .040 .040	1.80/2.20 1.80/2.20 1.80/2.20				.40c .40 .65	8.00 8.00 13.00		
NE 9415 NE 9420 NE 9422 NE 9430 NE 9435 NE 9437 NE 9440 NE 9442 NE 9445 NE 9450	.13/ .18 .18/ .23 .20/ .25 .28/ .33 .33/ .38 .35/ .40 .38/ .43 .40/ .45 .43/ .48 .48/ .53	.80/1.10 .80/1.10 .80/1.10 .90/1.20 .90/1.20 .90/1.20 .90/1.20 1.00/1.30 1.00/1.30	.040 .040 .040 .040 .040 .040 .040 .040	.040 .040 .040 .040 .040 .040 .040 .040	.20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35 .20/ .35	.30/ .50 .30/ .50 .30/ .50 .30/ .50 .30/ .50 .30/ .50 .30/ .50 .30/ .50 .30/ .50	.30/ .60 .30/ .60 .30/ .60 .30/ .60 .30/ .60 .30/ .60 .30/ .60 .30/ .60 .30/ .60	.08/ .15 .08/ .15 .08/ .15 .08/ .15 .08/ .15 .08/ .15 .08/ .15 .08/ .15 .08/ .15	.80 .80 .80 .80 .80 .80 .85 .85	16.00 16.00 16.00 16.00 16.00 16.00 17.00 17.00 17.00	1.30c 1.30 1.30 1.30 1.30 1.30 1.30 1.35 1.35	\$26.00 26.00 26.00 26.00 26.00 26.00 27.00 27.00 27.00
NE 9537° NE 9540° NE 9542° NE 9550°	.35/ .40 .38/ .43 .40/ .45 .48/ .53	1.20/1.50 1.20/1.50 1.20/1.50 1.20/1.50	.040 .040 .040 .040	.040 .040 .040 .040	.40/ .60 .40/ .60 .40/ .60 .40/ .60	.40/ .60 .40/ .60 .40/ .60	.40/ .70 .40/ .70 .40/ .70 .40/ .79	.15/ .25 .15/ .25 .15/ .25 .15/ .25	1.20 1.20 1.20 1.20	24.00 24.00 24.00 24.00	1.70 1.70 1.70 1.70	34.00 34.00 34.00 34.00
NE 9261 NE 9425 NE 9545	.55/ .65 .23/ .28 .43/ .48	.75/1.00 .80/1.10 1.20/1.50	.040 .040 .040	.040 .040 .040	1.80/2.20 .20/ .35 .40/ .60	.10/ .25 .38/ .50 .40/ .80	.30/ .60 .40/ .70	.08/ .15 :15/ .25				

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over: SAE bars, 1000 lb. and over: Exceptions: 1 500 to 1499 lb. 8 400 to 1499 lb. 8 400 to 3999 lb. 4 450 to 1499 lb. 8 1000 to 1999 lb. 60 to 1999 lb. 7 300 to 10,000 lb. \$ 2000 to 39,999 lb. ⁹ 400 to 14,999 lb. At Philadelphia galvanized sheets, 2500 more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb.; galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

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† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

th For zoned cities these grades have been revised to NE 8617-20.

‡ For zoned cities these grades have been revised to NE 9442-45 Ann'ld.

*Base delivered prices according to price zones established by Amendments to RPS 49 including the 3% transportation tax—not including the 6% freight increase of March 18, 1942, rescinded May 15, 1943.

*Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; f.o.b. Duluth, billets only, \$2.00 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00
Alloy steel: Pittsburgh, Cl	nicago.
Canton, Massillon, Buffa	
Bethlehem, per gross ton	

Shell Steel

cated le 49)

Cold rawn, 3100

8.453 8.494

8.381 8.25 8.711

8.33

9.55

sheets,

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extras s, 1500 r: Ex-

1b. • 0 999 lb. vanized rolled : San 199 lb.;

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cold sheets.

		I	er Gro	ss Ton
	12 in			
12 in. to	18 in			54.00
18 in. a	nd over			56.00
	open hear			
	gh, Chicago,			
	ungstown a			
Prices	delivered	Detroit	are	\$2.00
higher.				

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pitt	tsburgh,	C	hicago, C	leveland, Y	oungs-
town,	Buffal	0,	Canton,	Sparrows	Point,
-				Per Gro	
Open	hearth	or	bessemer		\$34.00

Skelp

Pittsbu	irgh, C	hicago,	Your	gstown,
		Sparrows		Md. Per Lb.
Grooved.	univers	al and she	ared	

Wire Rods

(No. 5 to 9/32 in.)

								er Lb.
Pittsburgh, Chicago	0.	C	lev	el	an	d		2.00c.
Worcester, Mass								
Birmingham								2.00c
San Francisco								
Galveston								

9/32 in. to 47/64 in., 0.15c, a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburg	ih.	1	3e	t1	il	e	h	e	122		94	81	111	100	1C	use
										1	30	18	36	2 4	ne	rll
High speed																670
Straight molybd	en	un	n			*	×					*	i			540
Tungsten-molybd	len	u	m		*			×	* 1	. ×					57	1/20
High-carbon-chro	om	iu	m		.5		×				*	*			*	430
Oil hardening .							4							*		240
special carbon																220
Extra carbon	* .						*									180
Regular carbon			* *		*	*								*		140
The state of the s																

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per 1b. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

Forging billets 21.25c.	No. 302 20,40c.
Bars	24.00c.
Plates	27.00c.
Structural shapes 25.00c.	24.00c.
Sheets	34.00c.
not rolled strip 23.50c.	21.50c.
Cold rolled strip 30.00c	28.00c.
Drawn wire	21.00c.

Straight-Chromium Alloys

F9 *****	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23,375c.
Bars	18.50c.			27.50c.
Plates	21.50c.	22.00c.		30,50c.
Sheets	26,50c.	29.00c.		36.50c.
Hot strip	.17.00c.		24.00c.	35.00c.
Cold strip	22.00c.	22.50c.		52 00c

Chromium-Nickel Clad Smel (20%)

DI.							ī			7		_	_		1	_	No. 304
Plates				0		0	0	0	0		0		0				18.00c.*
Sheets		0				0			0	0							19.00c.

^{*}Includes annealing and pickling.

Critically Needed Machinery SALVAGED



Metallizing Company of America

... with the help of KEYSTONE

Under the pressure of rapid fire, three-shift production, machinery is wearing away many times faster than normal. Thousands of essential moving parts go out of service daily.

Metallizing, however, has become the magic word for revitalizing "laid up" machinery, restoring service quickly, saving countless tons of metal, hours of machining and assembly - and avoiding overburdened replacement costs as well.

In this service of salvage, Keystone wire is performing a basic wartime function another important reason why Keystone production for civilian uses must be restricted until Victory is assured.



Abore—Here a badly worn crank-shaft is built up with the metallizing gun for machining back to original dimensions. Wire enters the back of the gun and is sprayed through the nozzle in molten form onto the worn surfaces. One of thousands of war-time uses for wire mill production.

The most critical raw material is still SCRAP. Get every pound to the steel mills.

KEYSTONE STEEL & WIRE CO.





PEORIA ILLINOIS



Air operated equipment works best when the correct pressure for each job is available. Oftentimes the right orking pressure is far less than full line pressure. Changing operations on the same machine requires a

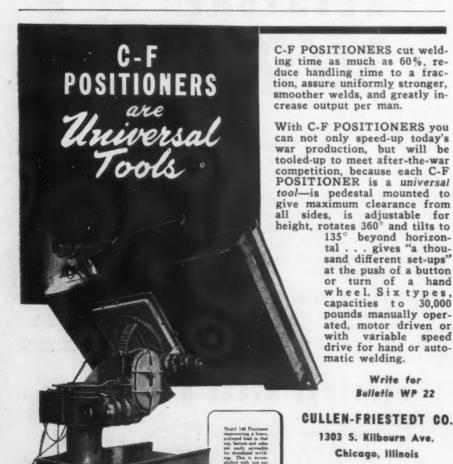
change in working pressure.

Look over your air operated equipment. You may find many places where reduced pressure will mean better performance, in addition to more efficient use of available air compressor capacity. With Hannifin pressure regulating valves, working pressure can be quickly and easily adjusted to the needs of each machine, and to different operations on the same machine.

Exclusive piston-type design, with long valve stem travel, provides large volumetric capacity and sensitive, accurate control of working pressures. Adjustment can be made over the entire working range from 150 lbs. down to provide any reduced operating pressure needed.

Three standard sizes, 3/8, 1/2, and 3/4 inch, for use on initial pressures up to 150 lbs. Write for Bulletin 56-A.

HANNIFIN MANUFACTURING COMPANY 621-631 S. Kolmar Ave., Chicago 24, Illinois



BOLTS, NUTS, RIVETS, SET SCREWS **Bolts and Nuts**

(F.o.b. Pittsburgh, Cleveland, Birming. ham or Chicago)

Machine ar	nd Carriage	Bolts: Per Cen	t Off List
	smaller x 6 in.	in. & shor	rter. 65%
34 to 1 i	n. x 6 in. & nd larger, a	shorter	61
All diame	eters over 6	in. long. :	59
	sizes		
Plow bo	lts		65

Arma Electu Motor Dyna Trans Trans

Trans

F.o. lb. o. dyna. lb. o.

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Nuts,	Co	Id P	unch	ed c	or t	tot	1	16	38	SE	30	0	
				gon									
1/2	in.	and	sm	alle	r .								
9/1	6 t	0 1	in.	incl	usi	ve.							
1 1/4	to	11/2	in	incl	usi	ve							

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin, Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller		64
½ in. and smaller	. 62	
1/2 in. through 1 in		60
9/16 to 1 in		**
11/2 in. through 11/2 in		58
1% in. and larger	. 56	

In full container lots, 10 per cent addi-

Pa	ckages	. nu	ts loc	se		71	1	an	d
In	packa	ges.	with	nuts	atta	ched			

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over

Large	Rivets (1	1/2	in		ar	ıd	larger)
F.o.b. cago,	Pittsburgh, Birmingha	n	Cl n	e1	e.	la	nd	se per 100 lb. l, Chi-

Small Rivets (7/16 in, and smaller) Per Cent Off List Cleveland, F.o.b. Pittsburgh, . 65 and 5 ago, Birmingham

Cap and Set Screws Per Cent Off List

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(2 1010) 22 177
Standard rails, heavier than 60 lb
No. 1 O.H., gross ton\$40.00
Angle bars, 100 lb 2.70
(F.o.b. Basing Points) Per Gross Ton
Light rails (from billets)\$40.00
Light rails (from rail steel) 39.00
Base per Lb.
Cut spikes3.00c.
Screw spikes
Tie plates, steel
Tie plates, steel
Tie plates, Pacific Coast2.30c.
Track bolts
Track bolts, heat treated, to rail- roads
Track bolts, jobbers discount63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

KOO	LIIAO IE	KIAE	LLMIL
(F.o.b.	Pittsburg	h, 112	Sheets)
		2 A P 00	- 90-98

8-1b.	coating	I.C.		2	0x14 in. \$6.00	20x28 in. \$12.00
	coating				7.00	14.00
0-1b.	coating	I.C.			7.50	15.00

- PRICES -

ELECTRICAL SHEETS

REWS

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Off List c. 65 \\delta \\delta

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100 lb. . . \$3.75 aller) Off List

Off List cap p to

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100 lb. w York

2.70 oss Ton \$40.00 39.00 per Lb. 3.00c 5.15c 2.15c 2.30c 4.75c

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smouth, Kansas am and alone alone nond.

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0x28 in.
12.00
14.00
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11-...5.00c. ...63-5

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																					er Lb.
Field grade																					
Armature .																					
Electrical			*	*	×		*	*	4	*			*	*	*	*	*	*	×		
Motor																					4.95c.
Dynamo																					5.65c.
Transformer																					6.15c.
Transformer																					7.15c.
Transformer																					
Transformer		5	2																*	*	8.45c.

F.o.b. Granite City, add 10c, per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

Base per Keg
Standard wire nails\$2.55
Coated nails
Base per 100 Lb.
Annealed fence wire
Base Column
Woven wire fence* 67
Fence posts (carloads) 69
Single loop bale ties 59
Galvanized barbed wiret 70
Twisted barbless wire 70

*15% gage and heavier. †On 80-rod spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe) Base Price—\$200 per Net Ton

Steel (Butt Weld)		
½ in	Black 63 1/2 66 1/2 68 1/2	Galv. 51 55 571/2
Wrought Iron (Butt Wel	d)	
¼ in. ¾ in. 1 and 1¼ in. 1½ in. 2 in.	25 30 34 38 37 ½	3½ 10 16 18½ 18
Steel (Lap Weld) 2 in. 2 ½ and 3 in. 3 ½ to 6 in.	61 64 66	49 14 52 1/2 5 4 1/2
Wrought Iron (Lap Weld)	
2 in	30 ½ 31 ½ 33 ½ 32 ½	12 14 1/2 18 17
Steel (Butt, extra strong,		
14 in	Black	Galv.

1 to 3 in.			. 67	57
Wrought	Iron	(Same as	Above)	
½ in			. 25	6

Steel (Lap. extra strong, plain ends)

f Ind	_	-	-	-	**	**	•	٠,	•	•••	20.2	Secretare	Circa
2 in												59	48 1/2
												63	521/2
3½ to 6 in.		*			4	*		*		*	*	66 1/2	56

Wrought Iron (Same as Above)

2 in 21/2									*				331/2	151/2
														221/2
41/2	to	6	in.	*	*	*	*	×	*	*	*		371/2	21

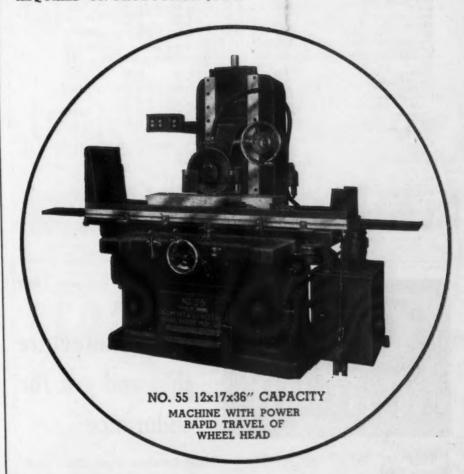
On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

GRAND RAPIDS

HYDRAULIC FEED

SURFACE GRINDERS

ARE MEETING THE MOST EXACTING NEEDS OF ARMY, NAVY AND AIR CORP CONTRACTORS WHERE EXTREME ACCURACY IS REQUIRED ON PRODUCTION JOBS.



THESE GRINDERS FEATURE

ONE PIECE COLUMN AND BASE CASTING PATENTED MOVEMENT OF WHEEL HEAD BIJUR ONE SHOT LUBRICATION TWO USABLE SPINDLE SPEED PORTABLE MOTOR DRIVEN COOLANT SYSTEM LONGITUDINAL TABLE SPEEDS UP TO 125 F.P.M.

If you are interested in surface grinders which combine tool room accuracy with production speed, send for Bulletin G-L. 100 today.

GRAND RAPIDS 4

MICHIGAN

PIG IRON

All putces set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos- phorus	Charcoal
Bostontt	\$25.50	\$25.00	\$26.50	\$25.50		
Brooklyn	27.50			28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia	25.84	25.34	26.84	26.34	\$30.74	
Bethlehem, Pa	25.00	24.50	26.00	25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50	****	
Swedeland, Pa	25.00	24.50	26.00	25.50		
Steelton, Pa		24.50	20.00	00.00	29.50	*****
Birdsboro, Pa	25.00	24.50	26.00	25.50	29.50	*****
Sparrows Point, Md	25.00	24.50	25.00	24.50		
Erie, Pa	24.00	23.50	25.90	24.00	*****	****
Characilla Da 9	24.00	23.50	24.50	24.00	* **	****
Sharpsville, Pa.*	24.00	23.00	25.00	24.50	29.50	*****
Cincinnati, Ohio	23.94	23.94		25.11	20.00	*****
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.86	
St. Louis	24.50	24.50	20.00	20.51		
Chicago	24.00	23.50	24.50	24.00	35.46	\$31.
Granite City, III.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00	32.42	
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00_	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00	32.42	1.4.0.0
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc				*****		\$ 34.00
Lyles, Tenn. fc.†		4000		*****	******	33.00
St. Paul	26.76	1071	27.26	26.76	39.80	
Ouluth	24.50	24.00	25.00	24.50		*****
Birmingham	20.38	19.00	25.00	*****	*****	
Los Angeles	26.95	*****		****	*****	*****
San Francisco	26.95	25.44	*****	****	*****	*****
Seattle	26.95	01 20		*****	*****	****
Provo, Utah	22.00	21.50	*****	28.00		*****
Montreai	27.50 25.50	27.50 25.50	*****	26.00		
I OF UNITO	25.50	25.50	*****	20.00		*****

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

6-i1 6-i1 6-i1 6-i1

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$23,50 at the furnace.

tEastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystle Iron Works, Everett, Mass., at \$2 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge \$30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.



A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

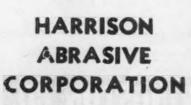
The unprecedented demand for our-

We manufacture shot and grit for endurance

HEAT-TREATED STEEL SHOT

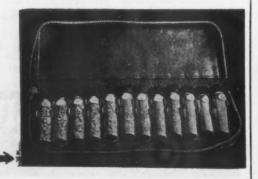
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.



Manchester, New Hampshire

HEAT-TREATED STEEL GRIT



Metal Powders

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cent per lb.

Tin, 100 mesh 58%c.
*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

		Seamless Cold Hot rawn Rolled	Lap Weld, Hot Rolled
2 in. o.d. 1	3 B.W.G.	15.03 13.04	12.38
21/2 in. o.d. 1	2 B.W.G.	20.21 17.54	16.58
3 in. o.d. 1	2 B.W.G.	22.48 19.50	18.35
3 1/2 in. o.d. 1	1 B.W.G.	28.37 24.62	
4 in. o.d. 1	0 B.W.G.	35.20 30.54	28.66
(Extras fo	or less car	load quanti	ties)
40,000 lb. or	ft., and o	ver	Base
30,000 lb. or			
20,000 lb. or	ft. to 29.	999 lb. or f	t. 10%
10,000 lb. or	ft. to 19.	999 lb. or f	t. 20%
5,000 lb. or	ft. to 9.	999 lb. or f	t. 30%
		999 lb. or f	
Under 2,000	lb. or ft		. 65%

CAST IRON WATER PIPE

tions per

Sharps-truthers io, may basing

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Chicago,

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1.00 per per ton 0.75 per

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to 23 %c. 0

to 25 4c 0 4 to 15c. 4c. h 63c. d, 0 to 33c. us 42c. er 3 to 27c. . 20.6c.

o 12 %c. 51c. . 51 %c. us metal . 58 % c.

sippi.

Tubes, per 100 lots.

Lap Weld.

12.38 16.58 18.35 28.66 ities)

Hot d Rolled

...Base ft. 5% ft. 10% ft. 20% ft. 30% ft. 45% ...65%

6-in. and larger, del'd Chicago... \$54.80 6-in. and larger, del'd New York... 52.20 6-in. and larger, Birmingham ... 46.00 6-in. and larger f.o.b. cars, San Francisco or Los Angeles ... 69.40 6-in. and larger f.o.b. cars, Seattle. 71.20

6-in. and larger f.o.b. cars, Seattle. 71.20
Class "A" and gas pipe, \$3 extra; 4-in.
pipe is \$3 a ton above 6-in. Prices shown
are for lots of less than 200 tons. For
200 tons or over, 6-in. and larger is \$45
at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los
Angeles, and \$70.20 at Seattle. Delivered
prices do not reflect new 3 per cent tax
on freight rates.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

					38 701	
Old range,	bessemer.	51.50		 	.\$4.7	5
Old range,	non-bessen	ier, 5	1.50	 	. 4.6	0
	ssemer, 51.					
Mesaba, no	on-bessemer	, 51.5	i0	 	. 4. ;	5
High phosp	phorus, 51.5	0		 	. 4.3	ä
					**	

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories,

COKE

Foundry †Connellsville, prompt 7.56 Foundry †Connellsville, prompt 7.56 Fayette County, W. Va. (Beehive) 8.14 By-product, Chicago 12.22 By-product, New England 13.77 By-product, Newark 12.40 to 12.93 By-product, Philadelphia 12.33 By-product, Cleveland 12.36 By-product, Clicinnati 11.77 By-product, Birmingham 8.55 By-product, Birmingham 3.59 By-product, St. Louis 12.56 By-product, Buffalo 12.56	Furnace
Foundry †Connellsville, prompt	Per Net To
Connellsville, prompt 7.56	†Connellsville, prompt\$6.50
By-product, Buffalo 12.50	Connelİsville, prompt 7.50 Fayette County, W. Va. (Beehive) 8.10 By-product, Chicago 12.25 By-product, New England 13.75 By-product, Newark 12.40 to 12.95 By-product, Philadelphia 12.38 By-product, Cleveland 12.30 By-product, Cincinnati 11.75 By-product, Birmingham 8.50 By-product, St. Louis 12.02
	Maximum by-product coke prices as

tablished by OPA became effective Oct.

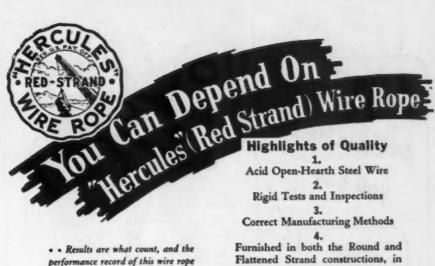
tablished by OPA became enterthy the state of the state o

FLUORSPAR

Pursuant to OPA Revised Maximum Price Regulation No. 126, effective July 1943, to Aug. 29, 1943, base price per short ton is set at \$33 for 70 per cent or more effective CaF₂ content; \$32 for 65 but less than 70 per cent; and \$30 for less than 60 per cent; F.o.b. consumer's plant (1) plus either railroad freight on such shipment from the producer's shipping point to the consumer's plant, or (2) railroad freight on such a shipment from Rosiclaire, Ill., to the consumer's plant, which ever is lower. On and after Aug. 30, 1943, the maximum price f.o.b. a consumer's plant on any shipment of metallurgical grade fluorspar shall be \$30 per short ton. Over \$30 may be charged provided the producer receives specific instructions from the Steel Division of WPB to the effect that a specific consumer must have one of the higher grades, as provided in Section No. 4 (b).

REFRACTORIES

(F.o.b. Works)
Fire Clay Brick Super-duty brick, St. Louis \$64.60 First quality, Pa., Md., Ky., Mo., Ill. 51.30 First quality, New Jersey 56.00 Sec. quality, Pa., Md., Ky., Mo., Ill. 46.55 Second quality, New Jersey 51.00 No. 1, Ohio 43.00 Ground fire clay, net ton 7.60
Silica Brick Penasylvania and Birmingham\$51.30 Chicago District
Chrome Brick Per Net Ton Standard, chemically bonded, Balt., Plymouth Meeting, Chester\$54,00
Magnesite Brick Standard, Balt. and Chester\$76.00 Chemically bonded, Baltimore65,00
Grain Magnesite Domestic, f.o.b. Balt. and Chester in sacks (carloads)\$14.00 Domestic, f.o.b. Chewelah, Wash. (in bulk)



performance record of this wire rope continues to make and hold friends. either Standard or Preformed Type.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

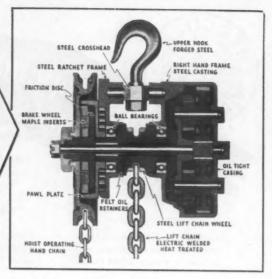




5657 FILLMORE STREET-CHICAGO 44, ILL. Eastern Office, 114 Liberty Street, New York &, N. Y. LOOK INSIDE the Chain Hoists Aon pnh ;



Ask for Catalog No. 58 which gives full details about Reading Chain Hoists to meet your needs. A note on your company letter-head will start your copy on its way.



• This cutaway view of a Reading Multiple Gear Chain Hoist shows you the compact, perfectly balanced construction with gears that run in oil. And all Reading Chain Hoists are given rigid safety tests before leaving the plant.

Reading Chain & Block Corporation, 2101 Adams St., Reading, Pa.

CHAIN HOISTS - ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

BRONZE BEARINGS OILLESS BRONZE BEARINGS GEAR BLANKS MACHINED BRONZE PARTS

S & H Bronze Bearings can be furnished in any size or quantity to meet your particular requirements.

Our equipment and manufacturing methods enable us to meet the most exacting specifications and design.

INDUSTRIAL



BEARINGS

S. & H. Bearing and Manufacturing Co., Inc. 340-344 North Avenue, East Cranford **New Jersey**

Ferromanganese

78-82% manganese, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn. Carload lots (bulk) ...\$135.00
Ton lots (packed) ...\$148.50
Less ton lots (packed) ...\$148.50
Premium, \$1.70 for each 1% above \$2%
Mn: penalty, \$1.70 for each 1% below 78%.

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 Maximum
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 contract
 prices
 per

 gross ton, lump, f.o.b.
 Palmerton, Pa.
 Pa.
 16-19% Mn
 19-21% Mn
 26-28% Mn
 1% max. Si
 1% max. Si
 1% max. Si
 1% max. Si
 23-20%
 1% max. Si
 1% max. Si
 48.50
 62.00
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Electric Ferrosilicon

OPA maximum base price cents per lb, contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

Eastern Central Western Zone 7.10c. 8.20c. Zone

50% silicon . . 6.65c. 7.10c. 7.25c.
75% silicon . . 8.05c. 8.20c. 8.75c.
Spot sales 45c. per lb. higher for 50% Si: 30c. for 75% Si. For extras and premiums see MPR 405.

 Silvery Iron
 (Per Gross Ton, base 6.00 to 6.50 Si)

 (Per Gross Ton, base 6.00 to 6.50 Si)
 \$29.50*

 F.o.b. Jackson, Ohio
 30.75*

 (Per Gross Ton, vast v... F.o.b. Jackson, Ohio

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over. *Official OPA price established June

Bessemer Ferrosilicon

above silvery iron Prices are \$1 a ton above silve quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

Eastern Central Western Zone Zone Zone Zone Green Zone Zone Zone Si, 2% Fe. 13.10c. 13.55c. 16.50c. 97% Si, 1% Fe. 13.45c. 13.90c. 16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

Control Western

Eastern Zone
Car lots . . . 3.35c. Central Western Zone 3,50c. Zone 3,65c.

Spot prices 1/4 c. higher per lb. of iquet. For premiums and extras see briquet. I MPR 405.

| MPK | 300. | Silicomanganese | (Per gross ton, delivered, carloads, bulk) | 3.00 carbon | \$120.00* | 2.50 carbon | 125.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | 130.00* | Silicomanganese
(Per gross ton, delivered, carloads.
3.00 carbon \$1
2.50 carbon \$1
2.00 carbon \$1
1.00 carbon \$1
Briquets, contract, basis carlots, bulk freight allowed, per lb...
Packed Less ton lots 140.00 5.80c.† 6.05c.† 6.55c.†

*Spot prices are \$5 per ton higher. †Spot prices ¼c. higher.

Ferrochrome

rerrocarome
(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per
lb. of contained Cr, lump size in carlots,
f.o.b. shipping point, freight allowed to
destination.

destina	ation.			Western
0.03% 0.06% 0.10% 1.00% 2.00%	carbon carbon carbon carbon		Zone 25.40c. 23.40c. 22.90c. 20.90c. 19.90c.	24.00c. 23.50c. 21.50c.

Spot prices are ¼c. higher per lb. contained Cr. For extras and premiums see MPR 407.

- PRICES -

f.o.b. York, Tenn. 35.00 41.00 48.50 82% below

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per % Mn ax. Si 50

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zone 7.25c, 8.75c. 50%

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Zone .65c.

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bulk) 20.00* 25.00* 30.00*

.80c.† .05c.† .55c.†

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Other Ferroalloys	
Ferrotungsten, delivered, carlots, per lb. contained tungsten \$	1.90
Tungsten metal powder, 98%-	2.60
Ferrovanadium, 35%-40%, con- tract basis, f.o.b. producers plant, usual freight allowances, open-hearth grade, per lb. con- tained vanadium.	2.70
	2.90
tained V ₂ O ₅ \$ Ferroboron, contract basis, 17.50% boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy\$	1.10
Ton lots	1.20 1.25
Silcaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities. per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
freight allowed 100 lb, and over, maximum based on rate to St. Louis, per lb,	45c.
Bortam, f.o.b. Niagara Falls	45c. 50c.
Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio,	\$7.00
Less ton lots	\$2.25 \$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots,	\$1.23 \$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium Less ton lots	\$1.35 \$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon. contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per gross ton\$; 3%-5% carbon	142.50 157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equaled with Rockdale, Tenn., per gross ton	
Ferrophosphorus, electrolytic 23- 26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	\$15.00
Calcium molybdate, 40%-45%, con- tract basis, f.o.b. Langeloth and	95c.
per lb. contained molybdenum.	
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Langeloth and Washington, Pa., per lb. contained Mo Molybdenum powder, 99%, in 200-	80c.
Molybdenum powder, 99%, in 200- lb. kegs, f.o.b. York, Pa., per lb. Under 100 lb. Zirconium, 35-40%, contract basis, carloads in bulk or package, per	\$2.60 \$3.00
Less ton lots	160.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton Packed Less ton lots Alsifer (approx. 20% Al, 40% Si	\$112.50
f.o.b. Niagara Falls, per lb Ton lots	7.50c. 8c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, carlots, f.o.b. Phila., Ohio, per lb. ton lots Less ton lots	9,50c.



A.I.S.I.

ALLOY STEELS FOR OFFENSE

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

WHEELOCK, LOVEJOY & CO., INC.

126 Sidney Street

Cambridge, Mass.

Cleveland, Chicago, Newark, Detroit, Buffalo, Cincinnati

Announcing

IRIDITE

The New, Super-thin, easy-to-apply coating that protects zinc and cadmium surfaces against corrosion

Here is a new chemical coating that is unusually simple in application and low in cost. When Iridite is applied it is "soaked up" by the plated metal . . . becomes integral with it. That's why Iridite cannot chip or flake off.

Caused by a chemical reaction with the metal itself, *Iridite* is uniform, opaque and olive drab in color . . . matching the familiar shade used by the armed forces for camouflage.

Although Iridite gives remarkable protection against corrosion from all ordinary means, it is so thin that it does not "pile up" to alter the dimensions of the part. Delicately machined and closely articulated parts can be protected by Iridite without affecting their use or operation. In addition, after it has been applied the flexibility of Iridite permits parts to be bent, twisted, or Iridite without chipping, flaking or affecting the protective qualities of the Iridite coating.

The *Iridite* process greatly increases the field of usefulness of zinc and cadmium as protective coatings.

HOW IRIDITE IS USED

Plated parts are protected by the *Iridite* process by simply dipping them in the *Iridite* solution from 10 to 60 seconds, and rinsing in hot water immediately after wards. Hot water is preferred in order to facilitate drying. The drying of the water from the part may be done by compressed air or by whatever other means are available. As soon as the part is dry it can be handled and shipped.

The only equipment needed are an acid-proof container for *Iridite* solution and a container for the hot water rinse. The *Iridite* solution is used at a temperature of from 75° to 100° F. depending on individual requirements.

The *Iridite* process can be applied to plated parts of any type or size, except in containers for edible products.

If you manufacture parts that are exposed to weather or to corrosion (except containers for food), you should send, immediately, for full details on the *Iridite* process. Better still, send us a part for *Iridite* coating, and test it any way you like. And, if your proposed use of *Iridite* requires an inspection of your production lines, our technical representative is at your service.

PROOF OF IRIDITE'S RESISTANCE TO CORROSION.





Part at left was zinc plated and Iridite coated, then subjected to intermittent dip in warm 4% salt water solution for 220 hrs. No corrosion. Under identical conditions zinc plated part at right, without Iridite protection, shows heavy corrosion.

RHEEM RESEARCH PRODUCTS, INC.

Subsidiary of RHEEM MANUFACTURING CO., 1209 E. 25th St., Baltimore, Md.